STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES

Division of Facilities Construction and Management

DFCM

Request For Bids For Construction Services

Two-Stage Bidding Process

Stage II – General Contractors Bidders List
Invitation to Bid

November 1, 2005

LARGE IRRIGATION POND REHABILITATION

UTAH VALLEY STATE COLLEGE

OREM, UTAH

DFCM Project No. 05227790

Nolte Associates, Inc.
5217 South State Street, Suite 300
Murray, Utah 84107
(801) 743-1300

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Current copies of the following documents are hereby made part of these contract documents by reference. These documents are available on the DFCM web site at http://dfcm.utah.gov or are available upon request from DFCM:

DFCM General Conditions dated May 25, 2005
DFCM Application and Certificate for Payment dated May 25, 2005

Technical Specifications:
Drawings:

The Agreement and General Conditions dated May 25, 2005 have been updated from versions that were formally adopted and in use prior to this date. The changes made to the General Conditions are identified in a document entitled Revisions to General Conditions that is available on DFCM's web site at http://dfcm.utah.gov

INVITATION TO BID

ONLY CONTRACTORS PREVIOUSLY SHORT-LISTED DURING STAGE I ARE ALLOWED TO BID ON THIS PROJECT

The State of Utah - Division of Facilities Construction and Management (DFCM) is requesting bids for the construction of the following project:

LARGE IRRIGATION POND REHABILITATION
UTAH VALLEY STATE COLLEGE – OREM, UTAH
DFCM PROJECT NO: 05227790

There are two ponds on the campus used for the irrigation system. This project is for work on the larger of the two ponds. The work includes removal of the existing plastic liner, overexcavation of the existing material, installation of a drainage field under the pond, backfilling with gravel, and the placement of a reinforced concrete liner system for the pond. Construction cost estimate: $685,600

FIRM NAME	POINT OF CONTACT	PHONE	FAX
ABCO Construction, Inc.	Mr. Reed Price	(435) 723-3770	(435) 723-3311
Ascent Construction	Mr. Dan Wall	(801) 299-1711	(801) 299-0663
Bellock Construction, Inc	Ms. Melody Bellock	(801) 277-7805	(801) 277-5751
Broderick and Henderson Const	Mr. Gary Broderick	(801) 225-9213	(801) 225-4697
Cal Wadsworth Construction	Mr. Cal Wadsworth	(801) 208-1957	(801) 208-1975
Chad Husband Construction, Inc	Mr. Richard Marshall	(801) 972-1146	(801) 886-1784
Comtrol Inc.	Mr. Ralph B. Burk	(801) 561-2263	(801) 561-2305
Darrell Anderson Construction	Mr. James Anderson	(435) 752-6860	(435) 752-7606
Garff Construction	Mr. Phil Henriksen	(801) 973-4248	(801) 972-1928
Gramoll Construction	Mr. Ken Romney	(801) 295-2341	(801) 295-2356
Jepson Construction	Mr. Rick Jepson	(801) 774-8860	(801) 773-8980
Keller Construction	Mr. S. Daniel Hill	(801) 972-1018	(801) 972-1063
McCullough Engineering	Mr. Jim McCullough	(801) 466-4949	(801) 466-4989
Saunders Construction	Mr. Edward Saunders	(801) 782-7830	(801) 782-7856
Spectrum Construction of Utah	Mr. Ronald Snowden	(801) 915-6222	(801) 607-2203
Valley Design and Construction	Mr. Corey King	(801) 927-9542	(801) 927-9544
Wade Payne Construction, Inc.	Mr. Wade Payne	(801) 226-6144	(801) 226-7772

The bid documents will be available at 9:00 AM on Tuesday, November 1, 2005 in electronic format from DFCM at 4110 State Office Building, Salt Lake City, Utah 84114, telephone (801)538-3018 and on the DFCM web page at http://dfcm.utah.gov. For questions regarding this project, please contact Craig Wessman, Project Manager, DFCM, at (801) 538-3246. No others are to be contacted regarding this project. A **MANDATORY** pre-bid meeting and site visit will be held at 9:30 AM on Friday, November 4, 2005 at UVSC in Orem, Utah. Meet at the large irrigation pond located above the new baseball field. All short listed prime contractors wishing to bid on this project must attend this meeting.

Bids must be submitted by 3:30 PM on Wednesday, November 16, 2005 to DFCM, 4110 State Office Building, Salt Lake City, Utah 84114. Bids will be opened and read aloud in the DFCM Conference Room, 4110 State Office Building, Salt Lake City, Utah. Note: Bids must be received at 4110 State Office Building by the specified time. The contractor shall comply with and require all of its subcontractors to comply with the license laws as required by the State of Utah. A bid bond in the amount of five percent (5%) of the bid amount, made payable to the Division of Facilities Construction and Management on DFCM's bid bond form, shall accompany the bid. The Division of Facilities Construction & Management reserves the right to reject any or all bids or to waive any formality or technicality in any bid in the interest of the State.

DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT
MARLA WORKMAN, CONTRACT COORDINATOR
4110 State Office Bldg., Salt Lake City, Utah 84114

STAGE II BIDDING PROCESS

ONLY CONTRACTORS PREVIOUSLY SHORT-LISTED DURING STAGE I ARE ALLOWED TO BID ON THIS PROJECT

1. Invitational Bid Procedures

Invitation to Bid: DFCM will notify each short-listed firm via e-mail and/or fax when a project is ready for construction services.

Bid Documents: Bidding documents including plans and specifications (if applicable) may be obtained by accessing DFCM's web page at http://dfcm.utah.gov or at DFCM's office 4110 State Office Building, Salt Lake City, Utah 84114.

Mandatory Pre-Bid Site Meeting: If required, the schedule contained in this document will indicate the date, time, and place of the mandatory pre-bid site meeting. At this meeting, contractors will receive additional instructions about the project and have an opportunity to ask questions about project details. If a firm fails to attend a pre-bid site meeting labeled "Mandatory" they will not be allowed to bid on the project.

Written Questions: The schedule contained in this document will indicate the deadline for submitting questions in writing to the DFCM Representative pertaining to this project.

Final Addendum: The schedule contained in this document will indicate the deadline for DFCM issuing the final addendum clarifying questions and changes to the scope of work. Contractors are responsible for obtaining and responding to information contained in the addenda.

Submitting Bids: Bids must be submitted to DFCM, 4110 State Office Building, Salt Lake City, Utah 84114 by the deadline indicated on the schedule contained in this document. Bids submitted after the deadline will not be accepted. Bids will be opened at DFCM on the date, time, and place indicated on the schedule. (Additional information pertaining to bidding is contained later in this document). It is your responsibility to allow for the time needed to park on Capitol Hill as recent construction activity has made the parking more difficult. Identification is required to enter the building.

Subcontractors List: The firm selected for the project must submit a list of all subcontractors by the deadline indicated on the schedule contained in this document. (Additional information pertaining to subcontractor lists is contained later in this document)

2. Drawings and Specifications, Other Contract Documents

Drawings and Specifications, as well as other available Contract Documents, may be obtained as stated in the Notice to Contractors.

3. **Bids**

Before submitting a bid, each bidder shall carefully examine the Contract Documents; shall visit the site of the Work; shall fully inform themselves as to all existing conditions and limitations; and shall include in the bid the cost of all items required by the Contract Documents. If the bidder observes that portions of the Contract Documents are at variance with applicable laws, building codes, rules, regulations or contain obvious erroneous or uncoordinated information, the bidder shall promptly notify the DFCM Representative and the necessary changes shall be accomplished by Addendum.

The bid, bearing original signatures, must be typed or handwritten in ink on the Bid Form provided in the procurement documents and submitted in a sealed envelope at the location specified by the Notice to Contractor's prior to the published deadline for the submission of bids.

Bid bond security, in the amount of five percent (5%) of the bid, made payable to the Division of Facilities Construction and Management, shall accompany bid. THE BID BOND MUST BE ON THE BID BOND FORM PROVIDED IN THE PROCUREMENT DOCUMENTS IN ORDER TO BE CONSIDERED AN ACCEPTABLE BID.

If the bid bond security is submitted on a bid bond form other than the DFCM's required bid bond form, and the bid security meets all other legal requirements, the bidder will be allowed to provide an acceptable bid bond by the close of business on the next business day following notification by DFCM of submission of a defective bid bond security. **Note: A cashier's check cannot be used as a substitute for a bid bond.**

4. **Contract and Bond**

The Contractor's Agreement will be in the form bound in the specifications. The Contract Time will be as indicated in the bid. The successful bidder, simultaneously with the execution of the Contract Agreement, will be required to furnish a performance bond and a payment bond, both bearing original signatures, upon the forms provided in the procurement documents. The performance and payment bonds shall be for an amount equal to one hundred percent (100%) of the Contract Sum and secured from a company that meets the requirements specified in the requisite forms. Any bonding requirements for Subcontractors will be specified in the Supplementary General Conditions.

5. Listing of Subcontractors

Listing of Subcontractors shall be as summarized in the "Instructions and Subcontractor's List Form", which are included as part of these Contract Documents. The subcontractors list shall be delivered to DFCM or faxed to DFCM at (801)538-3677 within 24 hours of the bid opening. Requirements for listing additional subcontractors will be listed in the Contract Documents.

DFCM retains the right to audit or take other steps necessary to confirm compliance with requirements for the listing and changing of subcontractors. Any contractor who is found to not be in compliance with these requirements is subject to a debarment hearing and may be debarred from consideration for award of contract for a period of up to three years.

6. Interpretation of Drawings and Specifications

If any person or entity contemplating submitting a bid is in doubt as to the meaning of any part of the drawings, specifications or other Contract Documents, such person shall submit to the DFCM Representative a request for an interpretation thereof. The person or entity submitting the request will be responsible for its prompt delivery. Any interpretation of the proposed documents will be made only by Addenda duly issued and a copy of such Addenda will be mailed or delivered to each person or entity receiving a set of documents. Neither DFCM nor A/E will be responsible for any other explanations or interpretations of the proposed documents. A/E shall be deemed to refer to the architect or engineer hired by DFCM as the A/E or Consultant for the Project.

7. Addenda

Any Addenda issued during the time of bidding shall become part of the Contract Documents made available to the bidders for the preparation of the bid, shall be covered in the bid, and shall be made a part of the Contract.

8. Award of Contract

The Contract will be awarded as soon as possible to the lowest, responsive and responsible bidder, based on the lowest combination of base bid and acceptable prioritized alternates, provided the bid is reasonable, is in the interests of the State of Utah to accept and after applying the Utah Preference Laws in U.C.A. Title 63, Chapter 56. The DFCM reserves the right to waive any technicalities or formalities in any bid or in the bidding. Alternates will be accepted on a prioritized basis with Alternate 1 being highest priority, Alternate 2 having second priority, etc.

9. **DFCM Contractor Performance Rating**

DFCM will evaluate the performance of the Contractor. This evaluation may include comments from the User. The Contractor will have an opportunity to review and comment on the evaluation. Evaluations, including the Contractor's comments, may be considered in future selection in the evaluation of the Contractor's past performance.

10. **Licensure**

The Contractor shall comply with and require all of its Subcontractors to comply with the license laws as required by the State of Utah.

11. **Right to Reject Bids**

DFCM reserves the right to reject any or all Bids.

12. **Time is of the Essence**

The completion deadline for this project is **March 1, 2006**. Failure to meet the completion deadline may result in a poor performance rating from DFCM which may have a negative impact on your firm's ability to obtain future work with the state of Utah and may also result in liquidated damages being assessed. Time is of the essence in regard to all the requirements of the Contract Documents.

13. **Withdrawal of Bids**

Bids may be withdrawn on written request received from bidders within 24 hours after the bid opening if the contractor has made an error in preparing the bid.

14. **Product Approvals**

Where reference is made to one or more proprietary products in the Contract Documents, but restrictive descriptive materials of one or more manufacturer(s) is referred to in the Contract Documents, the products of other manufacturers will be accepted, provided they equal or exceed

the standards set forth in the drawings and specifications and are compatible with the intent and purpose of the design, subject to the written approval of the A/E. Such written approval must occur prior to the deadline established for the last scheduled addenda to be issued. The A/E's written approval will be in an issued Addendum. If the descriptive material is not restrictive, the products of other manufacturers specified will be accepted without prior approval provided they are compatible with the intent and purpose of the design as determined by the A/E.

15. **Financial Responsibility of Contractors, Subcontractors and Sub-subcontractors**

Contractors shall respond promptly to any inquiry in writing by the DFCM to any concern of financial responsibility of the Contractor, Subcontractor or Sub-subcontractor.

16. **Debarment**.

By submitting a bid, the Contractor certifies that neither it nor its principals, including project and site managers, have been, or are under consideration for, debarment or suspension, or any action that would exclude such from participation in a construction contract by any governmental department or agency. If the Contractor cannot certify this statement, attach to the bid a detailed written explanation which must be reviewed and approved by the DFCM as part of the requirements for award of the Project.

PROJECT SCHEDULE
Stage II = Two-Stage Bidding Process

PROJECT NAME:	**LARGE IRRIGATION POND REHABILITATION UTAH VALLEY STATE COLLEGE – OREM, UTAH**
DFCM PROJECT #:	**05227790**

Event	Day	Date	Time	Place
Stage II Bidding Documents Available	Tuesday	November 1, 2005	9:00 AM	DFCM, 4110 State Office Bldg, SLC, UT and DFCM web site *
Mandatory Pre-bid Site Meeting	Friday	November 4, 2005	9:30 AM	Large Irrigation Pond ** Utah Valley State College Orem, UT
Last Day to Submit Questions	Wednesday	November 9, 2005	4:00 PM	DFCM, 4110 State Office Bldg, SLC, UT
Final Addendum Issued	Monday	November 14, 2005	12:00 NOON	DFCM, 4110 State Office Bldg, SLC, UT or DFCM web site*
Prime Contractors Turn in Bid and Bid Bond / Bid Opening in DFCM Conference Room	Wednesday	November 16, 2005	3:30 PM	DFCM, 4110 State Office Bldg, SLC, UT
Subcontractors List Due	Thursday	November 17, 2005	3:30 PM	DFCM, 4110 State Office Bldg, SLC, UT
Project Completion Date	Wednesday	March 1, 2006		

* **DFCM's web site address is http://dfcm.utah.gov**

** The large irrigation pond is located on the south side of campus just above the new baseball field. Enter the campus from University Avenue, proceed around the round-about and head to the west on the south campus perimeter road. There is a gated parking lot which will be open for this meeting. If the gate is down, call Craig Wessman on his cell phone at (801) 673-2107 and he will get the gate open. Park in the northwest portion of the lot, and the irrigation pond is located directly to the north.

BID FORM

NAME OF BIDDER _____ DATE _____

To the Division of Facilities Construction and Management
4110 State Office Building
Salt Lake City, Utah 84114

The undersigned, responsive to the "Notice to Contractors" and in accordance with the Request for Bids for the **LARGE IRRIGATION POND REHABILITATION – UTAH VALLEY STATE COLLEGE – OREM, UTAH - DFCM PROJECT NO. 05227790** and having examined the Contract Documents and the site of the proposed Work and being familiar with all of the conditions surrounding the construction of the proposed Project, including the availability of labor, hereby proposes to furnish all labor, materials and supplies as required for the Work in accordance with the Contract Documents as specified and within the time set forth and at the price stated below. This price is to cover all expenses incurred in performing the Work required under the Contract Documents of which this bid is a part:

I/We acknowledge receipt of the following Addenda: _____

For all work shown on the Drawings and described in the Specifications and Contract Documents, I/we agree to perform for the sum of:

_____ DOLLARS ($_____)
(In case of discrepancy, written amount shall govern)

I/We guarantee that the Work will be Substantially Complete by **March 1, 2006**, should I/we be the successful bidder, and agree to pay liquidated damages in the amount of **$350.00** per day for each day after expiration of the Contract Time as stated in Article 3 of the Contractor's Agreement.

This bid shall be good for 45 days after bid opening.

Enclosed is a 5% bid bond, as required, in the sum of _____

The undersigned Contractor's License Number for Utah is _____.

Upon receipt of notice of award of this bid, the undersigned agrees to execute the contract within ten (10) days, unless a shorter time is specified in Contract Documents, and deliver acceptable Performance and Payment bonds in the prescribed form in the amount of 100% of the Contract Sum for faithful performance of the contract. The Bid Bond attached, in the amount not less than five percent (5%) of the above bid sum, shall become the property of the Division of Facilities Construction and Management as liquidated damages for delay and additional expense caused thereby in the event that the contract is not executed and/or acceptable l00% Performance and Payment bonds are not delivered within time set forth.

Type of Organization:

_____
(Corporation, Partnership, Individual, etc.)

Any request and information related to Utah Preference Laws:

_____

Respectfully submitted,

_____
Name of Bidder

ADDRESS:

_____

_____

_____
Authorized Signature

BID BOND

(Title 63, Chapter 56, U. C. A. l953, as Amended)

KNOW ALL PERSONS BY THESE PRESENTS:

That _____ hereinafter referred to as the "Principal," and _____, a corporation organized and existing under the laws of the State of _____, with its principal office in the City of _____ and authorized to transact business in this State and U. S. Department of the Treasury Listed, (Circular 570, Companies Holding Certificates of Authority as Acceptable Securities on Federal Bonds and as Acceptable Reinsuring Companies); hereinafter referred to as the "Surety," are held and firmly bound unto the STATE OF UTAH, hereinafter referred to as the "Obligee," in the amount of $_____ (5% of the accompanying bid), being the sum of this Bond to which payment the Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that whereas the Principal has submitted to Obligee the accompanying bid incorporated by reference herein, dated as shown, to enter into a contract in writing for the _____ _____ Project.

NOW, THEREFORE, THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, that if the said principal does not execute a contract and give bond to be approved by the Obligee for the faithful performance thereof within ten (10) days after being notified in writing of such contract to the principal, then the sum of the amount stated above will be forfeited to the State of Utah as liquidated damages and not as a penalty; if the said principal shall execute a contract and give bond to be approved by the Obligee for the faithful performance thereof within ten (10) days after being notified in writing of such contract to the Principal, then this obligation shall be null and void. It is expressly understood and agreed that the liability of the Surety for any and all defaults of the Principal hereunder shall be the full penal sum of this Bond. The Surety, for value received, hereby stipulates and agrees that obligations of the Surety under this Bond shall be for a term of sixty (60) days from actual date of the bid opening.

PROVIDED, HOWEVER, that this Bond is executed pursuant to provisions of Title 63, Chapter 56, Utah Code Annotated, 1953, as amended, and all liabilities on this Bond shall be determined in accordance with said provisions to same extent as if it were copied at length herein.

IN WITNESS WHEREOF, the above bounden parties have executed this instrument under their several seals on the date indicated below, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

DATED this _____ day of _____, 20_____ .

Principal's name and address (if other than a corporation):

_____

_____

By: _____

Title: _____

Principal's name and address (if a corporation):

_____

_____

By: _____

Title: _____

(Affix Corporate Seal)

Surety's name and address:

_____

_____

By: _____

Attorney-in-Fact (Affix Corporate Seal)

STATE OF _____)
) ss.
COUNTY OF _____)

On this ____ day of _____, 20____, personally appeared before me _____, whose identity is personally known to me or proved to me on the basis of satisfactory evidence, and who, being by me duly sworn, did say that he/she is the Attorney-in-fact of the above-named Surety Company, and that he/she is duly authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings and obligations, and that he/she acknowledged to me that as Attorney-in-fact executed the same.

Subscribed and sworn to before me this _____ day of _____, 20_____.
My Commission Expires: _____
Resides at: _____

_____
NOTARY PUBLIC

Agency: _____
Agent: _____
Address: _____
Phone:

Approved As To Form: May 25, 2005
By Alan S. Bachman, Asst Attorney General

INSTRUCTION AND SUBCONTRACTORS LIST FORM

The three low bidders, as well as all other bidders that desire to be considered, are required by law to submit to DFCM within 24 hours of bid opening a list of **ALL** first-tier subcontractors, including the subcontractor's name, bid amount and other information required by Building Board Rule and as stated in these Contract Documents, on the following basis:

PROJECTS UNDER $500,000 - ALL SUBS $20,000 OR OVER MUST BE LISTED
PROJECTS $500,000 OR MORE - ALL SUBS $35,000 OR OVER MUST BE LISTED

- Any additional subcontractors identified in the bid documents shall also be listed.
- The DFCM Director may not consider any bid submitted by a bidder if the bidder fails to submit a subcontractor list meeting the requirements of State law.
- List subcontractors for base bid as well as the impact on the list that the selection of any alternate may have.
- Bidder may not list more than one subcontractor to perform the same work.
- Bidder must list "Self" if performing work itself.

LICENSURE:

The subcontractor's name, the type of work, the subcontractor's bid amount, and the subcontractor's license number as issued by DOPL, if such license is required under Utah Law, shall be listed. Bidder shall certify that all subcontractors, required to be licensed, are licensed as required by State law. A subcontractor includes a trade contractor or specialty contractor and does not include suppliers who provide only materials, equipment, or supplies to a contractor or subcontractor.

BIDDER LISTING 'SELF' AS PERFORMING THE WORK:

Any bidder that is properly licensed for the particular work and intends to perform that work itself in lieu of a subcontractor that would otherwise be required to be on the subcontractor list, must insert the term 'Self' for that category on the subcontractor list form. Any listing of 'Self' on the sublist form shall also include the amount allocated for that work.

'SPECIAL EXCEPTION':

A bidder may list 'Special Exception' in place of a subcontractor when the bidder intends to obtain a subcontractor to perform the work at a later date because the bidder was unable to obtain a qualified or reasonable bid under the provisions of U.C.A.Section 63A-5-208(4). The bidder shall insert the term 'Special Exception' for that category of work, and shall provide documentation with the subcontractor list describing the bidder's efforts to obtain a bid of a qualified subcontractor at a reasonable cost and why the bidder was unable to obtain a qualified subcontractor bid. The Director must find that the bidder complied in good faith with State law requirements for any 'Special Exception' designation, in order for the bid to be considered. If awarded the contract, the Director shall supervise the bidder's efforts to obtain a qualified subcontractor bid. The amount of the awarded contract may not be adjusted to reflect the actual amount of the subcontractor's bid. Any listing of 'Special Exception' on the sublist form shall also include amount allocated for that work.

GROUNDS FOR DISQUALIFICATION:

The Director may not consider any bid submitted by a bidder if the bidder fails to submit a subcontractor list meeting the requirements of State law. Director may withhold awarding the contract to a particular bidder if one or more of the proposed subcontractors are considered by the Director to be unqualified to do the Work or for such other reason in the best interest of the State of Utah. Notwithstanding any other provision in these instructions, if there is a good faith error on the sublist form, at the sole discretion of the Director, the Director may provide notice to the contractor and the contractor shall have 24 hours to submit the correction to the Director. If such correction is submitted timely, then the sublist requirements shall be considered met.

CHANGES OF SUBCONTRACTORS SPECIFICALLY IDENTIFIED ON SUBLIST FORM:

Subsequent to twenty-four hours after the bid opening, the contractor may change its listed subcontractors only after receiving written permission from the Director based on complying with all of the following criteria.

(1) The contractor has established in writing that the change is in the best interest of the State and that the contractor establishes an appropriate reason for the change, which may include, but not is not limited to, the following reasons: the original subcontractor has failed to perform, or is not qualified or capable of performing, and/or the subcontractor has requested in writing to be released.
(2) The circumstances related to the request for the change do not indicate any bad faith in the original listing of the subcontractors.
(3) Any requirement set forth by the Director to ensure that the process used to select a new subcontractor does not give rise to bid shopping.
(4) Any increase in the cost of the subject subcontractor work is borne by the contractor.
(5) Any decrease in the cost of the subject subcontractor work shall result in a deductive change order being issued for the contract for such decreased amount.
(6) The Director will give substantial weight to whether the subcontractor has consented in writing to being removed unless the Contractor establishes that the subcontractor is not qualified for the work.

EXAMPLE:

Example of a list where there are only four subcontractors:

TYPE OF WORK	SUBCONTRACTOR, "SELF" OR "SPECIAL EXCEPTION"	SUBCONTRACTOR BID AMOUNT	CONT. LICENSE #
ELECTRICAL	ABCD Electric Inc.	$350,000.00	123456789000
LANDSCAPING	"Self"	300,000.00	123456789000
CONCRETE (ALTERNATE #1)	XYZ Concrete Inc	298,000.00	987654321000
MECHANICAL	"Special Exception" (attach documentation)	Fixed at: 350,000.00	(TO BE PROVIDED AFTER OBTAINING SUBCONTRACTOR)

PURSUANT TO STATE LAW - SUBCONTRACTOR BID AMOUNTS CONTAINED IN THIS SUBCNTRACTOR LIST SHALL NOT BE DISCLOSED UNTIL THE CONTRACT HAS BEEN AWARDED.

SUBCONTRACTORS LIST

PROJECT TITLE: _____

Caution: You must read and comply fully with instructions.

TYPE OF WORK	SUBCONTRACTOR, "SELF" OR "SPECIAL EXCEPTION"	SUBCONTRACTOR BID AMOUNT	CONT. LICENSE #

We certify that:

1. This list includes all subcontractors as required by the instructions, including those related to the base bid as well as any alternates.
2. We have listed "Self" or "Special Exception" in accordance with the instructions.
3. All subcontractors are appropriately licensed as required by State law.

FIRM: _____

DATE: _____ SIGNED BY: _____

NOTICE: FAILURE TO SUBMIT THIS FORM, PROPERLY COMPLETED AND SIGNED, AS REQUIRED IN THESE CONTRACT DOCUMENTS, SHALL BE GROUNDS FOR DFCMS REFUSAL TO ENTER INTO A WRITTEN CONTRACT WITH BIDDER. ACTION MAY BE TAKEN AGAINST BIDDERS BID BOND AS DEEMED APPROPRIATE BY DFCM. ATTACH A SECOND PAGE IF NECESSARY.

FUGITIVE DUST PLAN

The Contractor will fill out the form and file the original with the Division of Air Quality and a copy of the form with the Division of Facilities Construction & Management, prior to the issuance of any notice to proceed.

The Contractor will be fully responsible for compliance with the Fugitive Dust Control Plan, including the adequacy of the plan, any damages, fines, liability, and penalty or other action that results from noncompliance.

Utah Division of Air Quality
April 20, 1999

GUIDANCE THAT MUST BE CONSIDERED IN DEVELOPING AND SUBMITTING A DUST CONTROL PLAN FOR COMPLIANCE WITH R307-309-3, 4, 5, 6, 7

Source Information:

1. Name of your operation (source): provide a name if the source is a construction site.

2. Address or location of your operation or construction site.

3. UTM coordinates or Longitude/Latitude of stationary emission points at your operation.

4. Lengths of the project, if temporary (time period).

5. Description of process (include all sources of dust and fugitive dust). Please, if necessary, use additional sheets of paper for this description. Be sure to mark it as an attachment.

6. Type of material processed or disturbed.

7. Amount of material processed (tons per year, tons per month, lbs./hr., and applicable units).

8. Destination of product (where will the material produced be used or transported, be specific, provide address or specific location), information needed for temporary relocation applicants.

9. Identify the individual who is responsible for the implementation and maintenance of fugitive dust control measures. List name(s), position(s) and telephone number(s).

10. List, and attach copies of any contract lease, liability agreement with other companies that may, or will, be responsible for dust control on site or on the project.

Description of Fugitive Dust Emission Activities
(Things to consider in addressing fugitive dust control strategies.)

1. Type of activities (drilling and blasting, road construction, development construction, earth moving and excavation, handling and hauling materials, cleaning and leveling, etc).

2. List type of equipment generating the fugitive dust.

3. Diagram the location of each activity or piece of equipment on site. Please attach the diagram.

4. Provide pictures or drawings of each activity. Include a drawing of the unpaved/paved road network used to move loads "on" and "off" property.

5. Vehicle miles travels on unpaved roads associated with the activity (average speed).

6. Type of dust emitted at each source (coal, cement, sand, soil, clay, dust, etc.)

7. Estimate the size of the release area at which the activity occurs (square miles). For haul or dirt roads include total miles of road in use during the activity.

Description of Fugitive Dust Emission Controls on Site

Control strategies must be designed to meet 20% opacity or less on site (a lesser opacity may be defined by Approval Order conditions or federal requirements such as NSPS), and control strategies must prevent exceeding 10% opacity from fugitive dust at the property boundary (site boundary) for compliance with R307-309-3.

1. Types of ongoing emission controls proposed for each activity, each piece of equipment, and haul roads.

2. Types of additional dust controls proposed for bare, exposed surfaces (chemical stabilization, synthetic cover, wind breaks, vegetative cover, etc).

3. Method of application of dust suppressant.

4. Frequency of application of dust suppressant.

5. Explain what triggers the use of a special control measure other than routine measures already in place, such as covered loads or measures covered by a permit condition (increase in opacity, high winds, citizen complaints, dry conditions, etc).

6. Explain in detail what control strategies/measures will be implemented off-hours, i.e., Saturdays/Sundays/Holidays, as well as 6 PM to 6 AM each day.

Description of Fugitive Dust Control Off-site

Prevent, to the maximum extent possible, deposition of materials, which may create fugitive dust on public and private paved roads in compliance with R307-309-5, 6, 7.

1. Types of emission controls initiated by your operation that are in place "off" property (application of water, covered loads, sweeping roads, vehicle cleaning, etc.).

2. Proposed remedial controls that will be initiated promptly if materials, which may create fugitive dust, are deposited on public and private paved roads.

Submit the Dust Control Plan to:

Executive Secretary
Utah Air Quality Board
POB 144820
15 North 1950 West
Salt Lake City, Utah 84114-4820

Phone: (801) 536-4000
FAX: (801) 536-4099

Fugitive Dust Control Plan Violation Report

When a source is found in violation of R307-309-3 or in violation of the Fugitive Dust Control Plan, the course must submit a report to the Executive Secretary within 15 days after receiving a Notice of Violation. The report must include the following information:

1. Name and address of dust source.

2. Time and duration of dust episode.

3. Meteorological conditions during the dust episode.

4. Total number and type of fugitive dust activities and dust producing equipment within each operation boundary. If no change has occurred from the existing dust control plan, the source should state that the activity/equipment is the same.

5. Fugitive dust activities or dust producing equipment that caused a violation of R-307-309-3 or the sources dust control plan.

6. Reasons for failing to control dust from the dust generating activity or equipment.

7. New and/or additional fugitive dust control strategies necessary to achieve compliance with R307-309-3, 4, 5, 6, or 7.

8. If it can not be demonstrated that the current approved Dust Control Plan can result in compliance with R307-309-3 through 7, the Dust Control Plan must be revised so as to demonstrate compliance with 307-309-3 through 7. Within 30 days of receiving a fugitive dust Notice of Violation, the source must submit the revised Plan to the Executive Secretary for review and approval.

Submit the Dust Control Plan to:

Executive Secretary
Utah Air Quality Board
POB 144820
15 North 1950 West
Salt Lake City, Utah 84114-4820

Phone: (801) 536-4000
FAX: (801) 536-4099

Attachments: DFCM Form FDR R-307-309, Rule 307-309

CONTRACTOR'S AGREEMENT

FOR:

_____
_____
_____

THIS CONTRACTOR'S AGREEMENT, made and entered into this ____ day of _____, 20__, by and between the DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT, hereinafter referred to as "DFCM", and _____, incorporated in the State of _____ and authorized to do business in the State of Utah, hereinafter referred to as "Contractor", whose address is _____.

WITNESSETH: WHEREAS, DFCM intends to have Work performed at _____ _____.

WHEREAS, Contractor agrees to perform the Work for the sum stated herein.

NOW, THEREFORE, DFCM and Contractor for the consideration provided in this Contractor's Agreement, agree as follows:

ARTICLE 1. SCOPE OF WORK. The Work to be performed shall be in accordance with the Contract Documents prepared by _____ and entitled "_____."

The DFCM General Conditions ("General Conditions") dated May 25, 2005 on file at the office of DFCM and available on the DFCM website, are hereby incorporated by reference as part of this Agreement and are included in the specifications for this Project. All terms used in this Contractor's Agreement shall be as defined in the Contract Documents, and in particular, the General Conditions.

The Contractor Agrees to furnish labor, materials and equipment to complete the Work as required in the Contract Documents which are hereby incorporated by reference. It is understood and agreed by the parties hereto that all Work shall be performed as required in the Contract Documents and shall be subject to inspection and approval of DFCM or its authorized representative. The relationship of the Contractor to the DFCM hereunder is that of an independent Contractor.

ARTICLE 2. CONTRACT SUM. The DFCM agrees to pay and the Contractor agrees to accept in full performance of this Contractor's Agreement, the sum of _____ _____ DOLLARS AND NO CENTS ($_____.00), which is the base bid, and which sum also includes the cost of a 100%

Performance Bond and a 100% Payment Bond as well as all insurance requirements of the Contractor. Said bonds have already been posted by the Contractor pursuant to State law. The required proof of insurance certificates have been delivered to DFCM in accordance with the General Conditions before the execution of this Contractor's Agreement.

ARTICLE 3. TIME OF COMPLETION AND DELAY REMEDY. The Work shall be Substantially Complete within _____ (___) calendar days after the date of the Notice to Proceed. Contractor agrees to pay liquidated damages in the amount of $_____ per day for each day after expiration of the Contract Time until the Contractor achieves Substantial Completion in accordance with the Contract Documents, if Contractor's delay makes the damages applicable. The provision for liquidated damages is: (a) to compensate the DFCM for delay only; (b) is provided for herein because actual damages can not be readily ascertained at the time of execution of this Contractor's Agreement; (c) is not a penalty; and (d) shall not prevent the DFCM from maintaining Claims for other non-delay damages, such as costs to complete or remedy defective Work.

No action shall be maintained by the Contractor, including its or Subcontractor or suppliers at any tier, against the DFCM or State of Utah for damages or other claims due to losses attributable to hindrances or delays from any cause whatsoever, including acts and omissions of the DFCM or its officers, employees or agents, except as expressly provided in the General Conditions. The Contractor may receive a written extension of time, signed by the DFCM, in which to complete the Work under this Contractor's Agreement in accordance with the General Conditions.

ARTICLE 4. CONTRACT DOCUMENTS. The Contract Documents consist of this Contractor's Agreement, the Conditions of the Contract (DFCM General Conditions, Supplementary and other Conditions), the Drawings, Specifications, Addenda and Modifications. The Contract Documents shall also include the bidding documents, including the Notice to Contractors, Instructions to Bidders/Proposers and the Bid/Proposal, to the extent not in conflict therewith and other documents and oral presentations that are documented as an attachment to the contract.

All such documents are hereby incorporated by reference herein. Any reference in this Contractor's Agreement to certain provisions of the Contract Documents shall in no way be construed as to lessen the importance or applicability of any other provisions of the Contract Documents.

ARTICLE 5. PAYMENT. The DFCM agrees to pay the Contractor from time to time as the Work progresses, but not more than once each month after the date of Notice to Proceed, and only upon Certificate of the A/E for Work performed during the preceding calendar month, ninety-five percent (95%) of the value of the labor performed and ninety-five percent (95%) of the value of materials furnished in place or on the site. The Contractor agrees to furnish to the DFCM invoices for materials purchased and on the site but not installed, for which the

Contractor requests payment and agrees to safeguard and protect such equipment or materials and is responsible for safekeeping thereof and if such be stolen, lost or destroyed, to replace same.

Such evidence of labor performed and materials furnished as the DFCM may reasonably require shall be supplied by the Contractor at the time of request for Certificate of Payment on account. Materials for which payment has been made cannot be removed from the job site without DFCM's written approval. Five percent (5%) of the earned amount shall be retained from each monthly payment. The retainage, including any additional retainage imposed and the release of any retainage, shall be in accordance with UCA 13-8-5 as amended. Contractor shall also comply with the requirements of UCA 13-8-5, including restrictions of retainage regarding subcontractors and the distribution of interest earned on the retention proceeds. The DFCM shall not be responsible for enforcing the Contractor's obligations under State law in fulfilling the retention law requirements with subcontractors at any tier.

ARTICLE 6. INDEBTEDNESS. Before final payment is made, the Contractor must submit evidence satisfactory to the DFCM that all payrolls, materials bills, subcontracts at any tier and outstanding indebtedness in connection with the Work have been properly paid. Final Payment will be made after receipt of said evidence, final acceptance of the Work by the DFCM as well as compliance with the applicable provisions of the General Conditions.

Contractor shall respond immediately to any inquiry in writing by DFCM as to any concern of financial responsibility and DFCM reserves the right to request any waivers, releases or bonds from Contractor in regard to any rights of Subcontractors (including suppliers) at any tier or any third parties prior to any payment by DFCM to Contractor.

ARTICLE 7. ADDITIONAL WORK. It is understood and agreed by the parties hereto that no money will be paid to the Contractor for additional labor or materials furnished unless a new contract in writing or a Modification hereof in accordance with the General Conditions and the Contract Documents for such additional labor or materials has been executed. The DFCM specifically reserves the right to modify or amend this Contractor's Agreement and the total sum due hereunder either by enlarging or restricting the scope of the Work.

ARTICLE 8. INSPECTIONS. The Work shall be inspected for acceptance in accordance with the General Conditions.

ARTICLE 9. DISPUTES. Any dispute, PRE or Claim between the parties shall be subject to the provisions of Article 7 of the General Conditions. DFCM reserves all rights to pursue its rights and remedies as provided in the General Conditions.

ARTICLE 10. TERMINATION, SUSPENSION OR ABANDONMENT. This Contractor's Agreement may be terminated, suspended or abandoned in accordance with the General Conditions.

ARTICLE 11. DFCM'S RIGHT TO WITHHOLD CERTAIN AMOUNT AND MAKE USE THEREOF. The DFCM may withhold from payment to the Contractor such amount as, in DFCM's judgment, may be necessary to pay just claims against the Contractor or Subcontractor at any tier for labor and services rendered and materials furnished in and about the Work. The DFCM may apply such withheld amounts for the payment of such claims in DFCM's discretion. In so doing, the DFCM shall be deemed the agent of Contractor and payment so made by the DFCM shall be considered as payment made under this Contractor's Agreement by the DFCM to the Contractor. DFCM shall not be liable to the Contractor for any such payment made in good faith. Such withholdings and payments may be made without prior approval of the Contractor and may be also be prior to any determination as a result of any dispute, PRE, Claim or litigation.

ARTICLE 12. INDEMNIFICATION. The Contractor shall comply with the indemnification provisions of the General Conditions.

ARTICLE 13. SUCCESSORS AND ASSIGNMENT OF CONTRACT. The DFCM and Contractor, respectively bind themselves, their partners, successors, assigns and legal representatives to the other party to this Agreement, and to partners, successors, assigns and legal representatives of such other party with respect to all covenants, provisions, rights and responsibilities of this Contractor's Agreement. The Contractor shall not assign this Contractor's Agreement without the prior written consent of the DFCM, nor shall the Contractor assign any moneys due or to become due as well as any rights under this Contractor's Agreement, without prior written consent of the DFCM.

ARTICLE 14. RELATIONSHIP OF THE PARTIES. The Contractor accepts the relationship of trust and confidence established by this Contractor's Agreement and covenants with the DFCM to cooperate with the DFCM and A/E and use the Contractor's best skill, efforts and judgment in furthering the interest of the DFCM; to furnish efficient business administration and supervision; to make best efforts to furnish at all times an adequate supply of workers and materials; and to perform the Work in the best and most expeditious and economic manner consistent with the interests of the DFCM.

ARTICLE 15. AUTHORITY TO EXECUTE AND PERFORM AGREEMENT. Contractor and DFCM each represent that the execution of this Contractor's Agreement and the performance thereunder is within their respective duly authorized powers.

ARTICLE 16. ATTORNEY FEES AND COSTS. Except as otherwise provided in the dispute resolution provisions of the General Conditions, the prevailing party shall be entitled to reasonable attorney fees and costs incurred in any action in the District Court and/or appellate body to enforce this Contractor's Agreement or recover damages or any other action as a result of a breach thereof.

IN WITNESS WHEREOF, the parties hereto have executed this Contractor's Agreement on the day and year stated hereinabove.

CONTRACTOR: _____

_____
Signature Date

Title: _____

State of _____)
)
County of _____) _____
Please type/print name clearly

On this ____ day of _____, 20____, personally appeared before me, _____, whose identity is personally known to me (or proved to me on the basis of satisfactory evidence) and who by me duly sworn (or affirmed), did say that he (she) is the _____ (title or office) of the firm and that said document was signed by him (her) in behalf of said firm.

_____
Notary Public

(SEAL)

My Commission Expires _____

APPROVED AS TO AVAILABILITY OF FUNDS:

_____
Financial Manager, Date
Division of Facilities Construction and Management

DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT

_____
_____ Date
Manager -
Capital _____

APPROVED AS TO FORM:
ATTORNEY GENERAL
May 25, 2005
By: Alan S. Bachman
Asst Attorney General

APPROVED FOR EXPENDITURE:

_____
Division of Finance Date

PERFORMANCE BOND

(Title 63, Chapter 56, U. C. A. 1953, as Amended)

That _____ hereinafter referred to as the "Principal" and _____, a corporation organized and existing under the laws of the State of _____, with its principal office in the City of _____ and authorized to transact business in this State and U. S. Department of the Treasury Listed (Circular 570, Companies Holding Certificates of Authority as Acceptable Securities on Federal Bonds and as Acceptable Reinsuring Companies); hereinafter referred to as the "Surety," are held and firmly bound unto the State of Utah, hereinafter referred to as the "Obligee, " in the amount of _____ _____ DOLLARS ($_____) for the payment whereof, the said Principal and Surety bind themselves and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written Contract with the Obligee, dated the _____ day of _____, 20____, to construct _____ in the County of _____, State of Utah, Project No. _____, for the approximate sum of _____ _____ Dollars ($_____), which Contract is hereby incorporated by reference herein.

NOW, THEREFORE, the condition of this obligation is such that if the said Principal shall faithfully perform the Contract in accordance with the Contract Documents including, but not limited to, the Plans, Specifications and conditions thereof, the one year performance warranty, and the terms of the Contract as said Contract may be subject to Modifications or changes, then this obligation shall be void; otherwise it shall remain in full force and effect.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the state named herein or the heirs, executors, administrators or successors of the Owner.

The parties agree that the dispute provisions provided in the Contract Documents apply and shall constitute the sole dispute procedures of the parties.

PROVIDED, HOWEVER, that this Bond is executed pursuant to the Provisions of Title 63, Chapter 56, Utah Code Annotated, 1953, as amended, and all liabilities on this Bond shall be determined in accordance with said provisions to the same extent as if it were copied at length herein.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of _____, 20_____.

WITNESS OR ATTESTATION:

_____

PRINCIPAL:

_____

By: _____ (Seal)

Title: _____

WITNESS OR ATTESTATION:

_____

SURETY:

_____

By: _____ (Seal)

Attorney-in-Fact

STATE OF _____)
) ss.
COUNTY OF _____)

On this _____ day of _____, 20____, personally appeared before me _____, whose identity is personally known to me or proved to me on the basis of satisfactory evidence, and who, being by me duly sworn, did say that he/she is the Attorney in-fact of the above-named Surety Company and that he/she is duly authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings and obligations, and that he/she acknowledged to me that as Attorney-in-fact executed the same.

Subscribed and sworn to before me this _____ day of _____, 20_____.

My commission expires: _____
Resides at: _____

_____
NOTARY PUBLIC

Agency: _____
Agent: _____
Address: _____
Phone: _____

Approved As To Form: May 25, 2005
By Alan S. Bachman, Asst Attorney General

PAYMENT BOND

(Title 63, Chapter 56, U. C. A. l953, as Amended)

KNOW ALL PERSONS BY THESE PRESENTS:

That _____ hereinafter referred to as the "Principal," and _____ _____, a corporation organized and existing under the laws of the State of _____authorized to do business in this State and U. S. Department of the Treasury Listed (Circular 570, Companies Holding Certificates of Authority as Acceptable Securities on Federal Bonds and as Acceptable Reinsuring Companies); with its principal office in the City of _____, hereinafter referred to as the "Surety," are held and firmly bound unto the State of Utah hereinafter referred to as the "Obligee," in the amount of _____ Dollars ($_____) for the payment whereof, the said Principal and Surety bind themselves and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written Contract with the Obligee, dated the _____ day of _____, 20____, to construct _____ in the County of _____, State of Utah, Project No. _____ for the approximate sum of _____ _____ Dollars ($_____), which contract is hereby incorporated by reference herein.

NOW, THEREFORE, the condition of this obligation is such that if the said Principal shall pay all claimants supplying labor or materials to Principal or Principal's Subcontractors in compliance with the provisions of Title 63, Chapter 56, of Utah Code Annotated, l953, as amended, and in the prosecution of the Work provided for in said Contract, then, this obligation shall be void; otherwise it shall remain in full force and effect.

That said Surety to this Bond, for value received, hereby stipulates and agrees that no changes, extensions of time, alterations or additions to the terms of the Contract or to the Work to be performed thereunder, or the specifications or drawings accompanying same shall in any way affect its obligation on this Bond, and does hereby waive notice of any such changes, extensions of time, alterations or additions to the terms of the Contract or to the Work or to the specifications or drawings and agrees that they shall become part of the Contract Documents.

PROVIDED, HOWEVER, that this Bond is executed pursuant to the provisions of Title 63, Chapter 56, Utah Code Annotated, 1953, as amended, and all liabilities on this Bond shall be determined in accordance with said provisions to the same extent as if it were copied at length herein.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of _____, 20____.

WITNESS OR ATTESTATION:

_____

PRINCIPAL:

_____

By: _____

(Seal)

Title: _____

WITNESS OR ATTESTATION:

_____

SURETY:

_____

By: _____

Attorney-in-Fact (Seal)

STATE OF _____)
) ss.
COUNTY OF _____)

On this _____ day of _____, 20____, personally appeared before me _____ _____, whose identity is personally known to me or proved to me on the basis of satisfactory evidence, and who, being by me duly sworn, did say that he/she is the Attorney-in-fact of the above-named Surety Company, and that he/she is duly authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings and obligations, and that he/she acknowledged to me that as Attorney-in-fact executed the same.

Subscribed and sworn to before me this _____ day of _____, 20_____.

My commission expires: _____

Resides at: _____

_____

NOTARY PUBLIC

Agency: _____
Agent: _____
Address: _____
Phone: _____

Approved As To Form: May 25, 2005
By Alan S. Bachman, Asst Attorney General

STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES

Division of Facilities Construction and Management

DFCM

CHANGE ORDER #_____

CONTRACTOR:

ARCHITECT:

AGENCY OR INSTITUTION:
PROJECT NAME:
PROJECT NUMBER:
CONTRACT NUMBER:
DATE:

CONSTRUCTION CHANGE DIRECTIVE NO.	PROPOSAL REQUEST NO.	AMOUNT		DAYS	
		INCREASE	DECREASE	INCREASE	DECREASE

	Amount	Days	Date
ORIGINAL CONTRACT			
TOTAL PREVIOUS CHANGE ORDERS			
TOTAL THIS CHANGE ORDER			
ADJUSTED CONTRACT			

DFCM and Contractor agree that the terms, contract sum, scope of the Work and time specified in this Change Order shall constitute the full accord and satisfaction, and complete adjustment to the Contract and includes all direct and indirect costs and effects related to, incidental to, and/or reasonably implied from such change in the contract terms, sum, scope of the Work and time.

Contractor:_____
Date

Architect/Engineer:_____
Date

Agency or Institution:_____
Date

DFCM: _____
Date

Funding Verification:_____
Date

CERTIFICATE OF SUBSTANTIAL COMPLETION

PROJECT _____ PROJECT NO: _____

AGENCY/INSTITUTION _____

AREA ACCEPTED _____

The Work performed under the subject Contract has been reviewed on this date and found to be Substantially Completed as defined in the General Conditions; including that the construction is sufficiently completed in accordance with the Contract Documents, as modified by any change orders agreed to by the parties, so that the State of Utah can occupy the Project or specified area of the Project for the use for which it is intended.

The DFCM accepts the Project or specified area of the Project as Substantially Complete and will assume full possession of the Project or specified area of the Project at _____ (time) on _____ (date).

The DFCM accepts the Project for occupancy and agrees to assume full responsibility for maintenance and operation, including utilities and insurance, of the Project subject to the itemized responsibilities and/or exceptions noted below:

_____

_____

_____

A list of items to be completed or corrected is attached hereto. The failure to include an item on it does not alter the responsibility of the Contractor to complete all the Work in accordance with the Contract Documents, including authorized changes thereof.

The Contractor shall complete or correct the Work on the list of items appended hereto within _____ calendar days from the above date of issuance of this Certificate. The amount withheld pending completion of the list of items noted and agreed to shall be: $_____.

_____ by: _____

CONTRACTOR (include name of firm) DATE

_____ by: _____

A/E DATE

_____ by: _____

USING INSTITUTION OR AGENCY DATE

_____ by: _____

DFCM DATE

cc: Parties Noted
DFCM, Director

STATE OF UTAH

DEPARTMENT OF ADMINISTRATIVE SERVICES
DIVISION OF FACILITIES CONSTRUCTION & MANAGEMENT
DFCM Project No. 05227790

UTAH VALLEY STATE COLLEGE
LARGE IRRIGATION POND REHABILITATION

TECHNICAL SPECIFICATIONS

Project Engineer

NOLTE ASSOCIATES, INC.
Consultants/Engineers
Salt Lake Office
5271 South State Street, Suite 300
Salt Lake City, Utah 84107
(801) 743-1300

October 2005

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SECTION 00310

BID SCHEDULES

1.01 PROJECT IDENTIFICATION

A. Name: **UTAH VALLEY STATE COLLEGE**
LARGE IRRIGATION POND REHABILITATION

B. Submitted to: Division of Facilities Construction and Management
4110 State Office Bldg.
Salt Lake City, Utah 84111

1.02 RELATED REQUIREMENTS

A. Section 01025: Measurement and Payment

1.01 BASE BID SCHEDULE

LARGE POND (POND 1)

ITEM	DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL AMOUNT
1	MOBILIZATION	1	LS		
2	EXCAVATION AND REMOVAL OF LINER, SEDIMENT, AND SUB-BASE MATERIAL	7000	CY		
3	UNDERDRAIN SYSTEM W/PERFORATED PIPE & SUMP	1	LS		
4	FURNISH AND INSTALL WASHED ROCK/FILL	4000	CY		
5	FURNISH AND INSTALL GEOTEXTILE	72000	SF		
6	REINFORCED CONCRETE LINER SYSTEM	1	LS		
				TOTAL BID	

THE FOLLOWING INFORMATION IS ACKNOWLEDGED BY THE BIDDER:

A. The BIDDER acknowledges that the OWNER may elect to increase or decrease the estimated quantities indicated in the above tables to reflect conditions encountered during installation of facilities.

COMPANY: _____

Signed: _____

Title: _____

Date: _____

SECTION 01010

SUMMARY OF WORK

PART 1 GENERAL

1.01 GENERAL CONDITIONS

A. The work to be performed under this project shall consist of furnishing all labor, materials, and equipment necessary or required to complete the work in all respects as shown on the plans and as herein specified. All work, materials, and services not expressly shown or called for in the Contract Documents which may be necessary to complete the construction of the work in good faith shall be performed, furnished, and installed by CONTRACTOR as though originally so specified or shown, at no increase in cost to OWNER.

1.02 WORK COVERED BY CONTRACT DOCUMENTS

A. The purpose of this project is to rehabilitate the existing large irrigation pond on the UVSC campus. The work shall include the removal of the existing PVC liner, excavation to the proposed grades, and construction of a new concrete liner. The work shall also include the placement of a groundwater under drain collection system.

1.01 CONTRACT METHOD

A. The work hereunder will be constructed under a unit cost and lump sum contract.

B. CONTRACTOR shall include the General Conditions and Supplementary Conditions of the Contract as a part of all of its subcontract agreements.

1.02 WORK SEQUENCE

A. The contract time for substantial and final completion is as indicated in the Agreement (Document 00500), and is on a calendar day basis commencing from the date of the Notice to Proceed.

1.03 CONTRACTOR USE OF PROJECT SITE

A. CONTRACTOR's use of the project site shall be limited to its construction operations, including on-site storage of materials, on-site fabrication facilities, and field offices.

1.04 PROJECT SECURITY

A. CONTRACTOR shall make all necessary provisions to protect the project and CONTRACTOR's facilities from fire, theft, and vandalism, and the public from unnecessary exposure to injury.

1.05 CHANGES IN THE WORK

A. It is mutually understood that it is inherent in the nature of municipal construction that some changes in the plans and specifications may be necessary during the course of construction to adjust them to field conditions, and that it is of the essence of the Contract to recognize a normal and expected margin of change. The ENGINEER shall have the right to make such changes, from time to time, in the plans, in the character if the work, and in the scope of the project as may be necessary or desirable to ensure the completion of the work in the most satisfactory manner without invalidating the Contract.

- END OF SECTION -

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 GENERAL

A. All work completed under this contract shall be in accordance with the Plans and Specifications and will be measured by the ENGINEER.

B. The term "Lump Sum" when used as an item of payment will mean complete payment for the work described in the contract. When a complete structure, portion of work, or unit is specified "Lump Sum" as the unit of measurement, the unit will include fittings, accessories, and all work necessary to complete the work as shown on the plans and as specified.

C. Discounts and Sales Tax.

1. CONTRACTOR shall maintain full responsibility for all materials and is to include all costs of materials and taxes as part of their bid.

1.02 UVSC LARGE IRRIGATION POND REHABILITATION

A. MOBILIZATION

1. **GENERAL** This bid item is provided to cover CONTRACTOR's cost for general and miscellaneous responsibilities and operations not normally attributed to, any other single bid item within this schedule. This shall include, but is not limited to, work described or enumerated in Section 01505, Mobilization.

2. **METHOD OF MEASUREMENT** Mobilization shall not be measured, but shall be paid for on a lump sum basis for the completion of the work as required in Section 01505, Mobilization

3. **BASIS OF PAYMENT** Payment for "Mobilization" will be made at the contract lump sum bid price. Payments will be made in accordance with the following schedule:

   a. When 10% of the original contract amount is earned, 25% of the amount bid for mobilization will be paid.

b. When 25% of the original contract amount is earned, 50% of the amount bid for mobilization will be paid.

c. When 50% of the original contract amount is earned, 75% of the amount bid for mobilization will be paid.

d. When 75% of the original contract amount is earned, 100% of the amount bid for mobilization will be paid.

B. EXCAVATION AND REMOVAL OF LINER, SEDIMENT, AND SUB-BASE MATERIAL

1. **METHOD OF MEASUREMENT** This Bid Item shall be paid for on a unit price basis for the completion of the work.

2. **BASIS OF PAYMENT** Payment shall be made at the contract unit bid price per cubic yard. Payment shall be considered complete compensation for all labor, and equipment, to excavate and remove the existing liner, existing concrete structures, and sediment. This also includes over-excavating the sub-basin material and complete removal of all excavated materials from the site.

C. FURNISH AND INSTALL GEOTEXTILE

1. **METHOD OF MEASUREMENT** This Bid Item shall be paid for on a unit price basis for the completion of the work.

2. **BASIS OF PAYMENT** Payment shall be made at the contract unit bid price per square foot. Payment shall be considered complete compensation for all labor, equipment and materials to place the geotextile per the design drawings and manufactures specifications.

D. FURNISH AND INSTALL WASHED ROCK/STRUCTURAL FILL

1. **METHOD OF MEASUREMENT** This Bid Item shall be paid for on a unit price basis for the completion of the work.

2. **BASIS OF PAYMENT** Payment shall be made at the contract unit bid price per cubic yard. Payment shall be considered complete compensation for all labor, equipment and materials to place the washed rock per the design drawings.

E. REINFORCED CONCRETE LINER SYSTEM

1. **METHOD OF MEASUREMENT** This Bid Item shall be paid for on a lump sum for the completion of the work.

2. **BASIS OF PAYMENT** Payment shall be made at the lump sum bid price. Payment shall be considered complete compensation for all labor, equipment and materials to place the reinforced concrete per the design drawings. This includes steel reinforcement, water stop, restoration of surface improvements around the pond, doweling into the existing curb wall and placing and finishing the concrete.

F. UNDERDRAIN SYSTEM WITH PERFORATED PIPE AND SUMP

1. **METHOD OF MEASUREMENT** This Bid Item shall be paid for on a lump sum for the completion of the work.

2. **BASIS OF PAYMENT** Payment shall be made at the lump sum bid price. Payment shall be considered complete compensation for all labor, equipment and materials to excavate and place the sump vault, pumping and support equipment, electrical connection to existing power, piping and perforated drain pipe per the design drawings.

- END OF SECTION -

SECTION 01040

COORDINATION

PART 1 GENERAL

1.01 GENERAL

A. The OWNER and/or utility owners may be working within the project area while this contract is in progress. If so, the CONTRACTOR shall schedule his work in conjunction with these other entities to minimize mutual interference.

B. CONTRACTOR shall notify ENGINEER of the schedule for materials testing required by CONTRACTOR in Section 01440 a minimum of 24 hours in advance in order to provide ENGINEER time for scheduling of desired Quality testing.

C. CONTRACTOR shall notify Owners of Private right-of-ways 72 hours prior to work being performed across Owners' right-of-ways.

D. If required to work in Utah Department Of Transportation (UDOT) right-of-way, CONTRACTOR shall notify UDOT 72 hours prior to work being performed therein. Work within the UDOT right-of-way shall be in accordance with their required permit and their license agreement with OWNER.

E. A public notification program shall be implemented, and shall as a minimum, require the Contractor to be responsible for contacting each home or business connected to the waterline and informing them of the work to be conducted, and when the water service will be back online. The Contractor shall also provide the following:

1. Written notice to be delivered to each home or business the day prior to the beginning of work being conducted on the section, and a local telephone number of the Contractor they can call to discuss the project or any problems which could arise.

F. The CONTRACTOR's working hours shall be within the hours of 7 AM to 6 PM.

- END OF SECTION -

SECTION 01050

FIELD ENGINEERING

PART 1 GENERAL

1.01 GENERAL

A. CONTRACTOR shall provide all survey construction staking as necessary to complete the facilities and appurtenant work according to the contract documents, including:

1. Benchmark network throughout the construction zone.
2. Cut and fill staking with offset for pond liner construction.
3. Removal and replacement of survey monuments if required. Any removal of survey monuments, without notification to the Engineer/Surveyor, is illegal and replacement costs will be charged to the CONTRACTOR.

B. CONTRACTOR shall be responsible for notifying utility owners to request location staking of all utilities in the areas of construction. All utility staking shall be protected during construction activities from removal and disturbance. CONTRACTOR shall be responsible for replacement of all stakes removed as a result of CONTRACTOR and Subcontractor activities.

- END OF SECTION -

SECTION 01070

ABBREVIATIONS

PART 1 GENERAL

1.01 DESCRIPTION

A. Wherever in these Specifications references are made to the standards, specifications, or other published data of the various national, regional, or local organizations, such organizations may be referred to by their acronym or abbreviation only. As a guide to the user of these specifications, the following acronyms or abbreviations which may appear in these specifications shall have the meanings indicated herein.

1.02 ABBREVIATIONS AND ACRONYMS

AAR	Association of American Railroads
AASHTO	American Association of the State Highway and Transportation Officials
ACI	American Concrete Institute
AGA	American Gas Association
AGC	American General Contractors
AI	The Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American Nation Standards Institute, Inc.
APWA	American Public Works Association
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASOC	American Society of Quality Control
ASSE	American Society of Sanitary Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
AWWA	American Water Works Association
BBC	Basic Building Code, Building Officials and Code Administrators International
CEMA	Conveyors Equipment Manufacturer's Association
CGA	Compressed Gas Association

CLFMI	Chain Link Fence Manufacturer's Institute
CMA	Concrete Masonry Association
CRSI	Concrete Reinforcing Steel Institute
DWQ	Department of Water Quality
DWR	Drinking Water Regulations
EIA	Electronic Industries Association
ETC	Electrical Test Laboratories
ICBO	International Conference of Building Officials
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineering Society
IME	Institute of Makers of Explosives
ISA	Instrument Society of America
ISO	International Organization of Standardization
ITE	Institute of Traffic Engineers
MBMA	Metal Building Manufacturer's Association
NACE	National Association of Corrosion Engineers
NBS	National Bureau of Standards
NEC	National Electrical Code
NEMA	National Electrical Manufacturer's Association
NFPA	National Fire Protection Association
NFPA	National Forest Products Association
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
RWMA	Resistance Welder Manufacturer's Association
SAE	Society of Automotive Engineers
SSPWC	Standard Specification for Public Works Construction
UDOT	Utah Department of Transportation
UBC	Uniform Building Code
UL	Underwriters Laboratories, Inc.
UPRR	Union Pacific Railroad
WCRSI	Western Concrete Reinforcing Steel Institute
WRI	Wire Reinforcements Institute, Inc.
WWPA	Western Wood Products Association

- END OF SECTION -

SECTION 01090

REFERENCE STANDARDS

PART 1 GENERAL

1.01 GENERAL

A. TITLES OF SECTIONS AND PARAGRAPHS. Captions accompanying Specifications sections and paragraphs are for convenience of reference only, and do not form a part of the Specification.

B. APPLICABLE PUBLICATIONS. Whenever in these specifications references are made to published specifications, codes, standards, or other requirements, it shall be understood that wherever no date is specified, only the latest specifications, standards or requirements of the respective issuing agencies which have been published as of the date that the work is advertised for bids, shall apply; except to the extent that said standards or requirements may be in conflict with applicable laws, ordinances, or governing codes. No requirements set forth herein or shown on the drawings shall be waived because of any provision of, or omission from, said standards or requirements.

C. SPECIALISTS, ASSIGNMENTS. In certain instances, specifications test requires (or implies) that specific work is to be assigned to specialists or expert entities, who must be engaged for the performance of that work. Such assignments shall be recognized as special requirements and shall not be interpreted so as to conflict with the enforcement of building codes and similar regulations governing the work; also they are not intended to interfere with local union jurisdiction settlements and similar conventions. Such assignments are intended to establish which party or entity involved in a specific unit of work is recognized as "expert" for the indicated construction processes or operations. Nevertheless, the final responsibility for fulfillment of the entire set of contract requirements remains with CONTRACTOR.

1.02 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of other requirements of the specifications, all work specified herein shall conform to or exceed the requirements of all applicable codes and the applicable requirements of the following documents to the extent that the provisions of such documents are not in conflict with the requirements of these Specifications nor the applicable codes.

B. Reference herein to "Building Code" or IBC shall mean the International Building Code of the International Conference of Building Officials (ICBO). The latest edition of the code as approved and used by the local agency as of the date of award, as adopted by the agency having jurisdiction, shall apply to the work herein, including all addenda, modifications, amendments, or other lawful changes thereto.

C. In case of conflict between codes, reference standards, drawings and the other Contract Document, the most stringent requirements shall govern. All conflicts shall be brought to the attention of the ENGINEER for clarification and directions prior to ordering or providing any materials or labor. CONTRACTOR shall bid the most stringent requirements.

D. APPLICABLE STANDARD SPECIFICATIONS. CONTRACTOR shall construct the work specified herein in accordance with the requirements of the Contract Documents and the referenced portions of those referenced codes, standards, and specifications listed herein; except, that wherever references to "Standard Specifications" are made, the provisions therein for measurement and payment shall not apply.

E. References in the Contract Documents to "Standard Specifications" shall mean the Contract Documents including all current supplements, addenda, and revisions thereof.

F. References herein to "OSHA Regulations for Construction" shall mean Title 29, Part 1926, Construction Safety and Health Regulations, Code of Federal Regulations (OSHA), including all changes and amendments thereto.

G. References herein to "OSHA Standards" shall mean Title 29, Part 1910, Occupational Safety and Health Standards, Code of Federal Regulations (OSHA), including changes and amendments thereto.

H. Reference herein to APWA shall mean the latest edition of the “Manual of Standard Specifications” and “Manual of Standard Plans” as prepared by the American Public Works Association and the Associated General Contractors of America.

- END OF SECTION -

SECTION 01210

PROJECT MEETINGS

PART 1 GENERAL

1.01 PRECONSTRUCTION CONFERENCE

A. Prior to the commencement of work at the site, a preconstruction conference will be held at a mutually agreed time and place which shall be attended by CONTRACTOR, its superintendent, and its subcontractors as appropriate. Other attendees will be:

1. ENGINEER and the Resident Project Representative (RPR).
2. Representatives of OWNER.
3. Governmental representatives as appropriate.
4. Others as requested by CONTRACTOR, OWNER, or ENGINEER.

B. Unless previously submitted to ENGINEER, CONTRACTOR shall bring to the conference one copy of each of the following:

1. Progress schedule.
2. Procurement schedule of major equipment and materials and items requiring long lead time.
3. Shop Drawings/Sample/Substitute or "Or Equal" submittal schedule.

C. The purpose of the conference is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedures for handling such matters established. The complete agenda will be furnished to CONTRACTOR prior to the meeting date, which may include the following:

1. CONTRACTOR's tentative schedules.
2. Transmittal, review, and distribution of CONTRACTOR's submittals.
3. Processing applications for payment.
4. Maintaining record documents.
5. Critical work sequencing.
6. Field decisions and Change Orders.
7. Use of project site, office and storage areas, security, housekeeping, and OWNER's needs.
8. Major equipment deliveries and priorities.
9. CONTRACTOR's assignments for safety and first aid.

D. ENGINEER will preside at the preconstruction conference and will arrange for keeping the minutes and distributing the minutes to all persons in attendance.

1.02 PROGRESS MEETINGS

A. CONTRACTOR shall schedule and hold regular on-site progress meetings at least weekly and at other times as required by ENGINEER or as required by progress of the work. CONTRACTOR, ENGINEER, and all subcontractors active on the site shall be represented at each meeting. CONTRACTOR may at its discretion request attendance by representatives of its suppliers, manufacturers, and other subcontractors.

B. ENGINEER shall preside at the meetings and provide for keeping and distribution of the minutes. The purpose of the meetings will be to review the progress of the work, maintain coordination of efforts, discuss changes in scheduling, and resolve other problems which may develop.

C. At each construction progress meeting a progress report shall be presented by the CONTRACTOR containing an updated Progress Schedule. Where the delayed completion data of a project phase is noted, the Contractor shall describe the anticipated delays or problems and outline the action plan being taken to counter their effect.

1.03 MEASUREMENT AND PAYMENT

A. Project Meetings shall not be measured or paid as a separate item, but shall be included as part of the various items to which it relates.

- END OF SECTION -

SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Procedures
B. Construction Progress Schedules
C. Schedule of Values
D. Shop Drawings
E. Product Data
F. Manufacturer's Instructions
G. Manufacturer's Certificates
H. Samples

1.02 RELATED REQUIREMENTS

1.03 PROCEDURES

A. Deliver submittals to the office of the Engineer:

Nolte Associates, Inc.
5217 South State Street, Suite 300
Murray, Utah 84107
Attn: Delmas Johnson, P.E.

B. Transmit each item under Engineer-accepted form. Identify Project, Contractor, subcontractor, major supplier; identify pertinent Drawing sheet and detail number, and Specification Section number, as appropriate. Identify deviations from Contract Documents. Provide space for Contractor and Engineer review stamps.

C. Comply with progress schedule for submittals related to Work progress. Coordinate submittal of related items.

D. After Engineer review of submittal, revise and resubmit as required, identifying changes made since previous submittal.

E. Distribute copies of reviewed submittals to concerned persons. Instruct recipients to promptly report any inability to comply with provisions.

1.04 CONSTRUCTION PROGRESS SCHEDULES

A. Contractor to submit a construction progress schedule.

B. Show complete sequence of construction by activity, identifying work of separate stages and other logically grouped activities. Show projected percentage of completion for each item of Work as of time of each Application for Progress Payment.

C. Show submittal dates required for shop drawings, product data, and samples, and product delivery dates, including, if applicable, those furnished by Owner and those under Allowances.

1.05 SCHEDULE OF VALUES

A. Submit typed schedule on 8-1/2" x 11" paper; Contractor's standard form or media- driven printout will be considered on request.

B. Format: Table of Contents of this Project Manual. Identify each line item with number and title of the major Specification Sections.

C. Include in each line item a directly proportional amount of Contractor's overhead and profit.

D. Provide a subschedule for each separate stage of Work specified in Section 01005.

E. Revise schedule to list change orders, for each application for payment.

1.06 SHOP DRAWINGS

A. Submit the number of copies which Contractor requires, plus two (2) copies which will be retained by Engineer.

1.07 PRODUCT DATA

A. Mark each copy to identify applicable products, models, options, and other data; supplement manufacturers' standard data to provide information unique to the Work.

B. Submit the number of copies which Contractor requires, plus two (2) copies which will be retained by Engineer.

1.08 MANUFACTURER'S INSTRUCTIONS

A. When required in individual Specification Section, submit manufacturer's printed instructions for delivery, storage, assembly, installation adjusting, and finishing, in quantities specified for product data.

1.09 MANUFACTURER'S CERTIFICATES

A. Provide certificates of compliance with specifications as requested by Engineer or individual Specifications sections.

1.10 SAMPLES

A. Provide samples of materials as required by individual Specification sections.

B. Include identification on each sample, giving full information.

C. Submit the number specified in respective Specification section; one will be retained by Architect/Engineer.

D. Provide field samples of finishes at Project as required by individual Specifications section.

- END OF SECTION -

SECTION 01440

QUALITY CONTROL & MATERIALS TESTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Responsibilities for controlling quality of materials, products and workmanship.

B. Responsibilities for manufacturer's instructions, certificates and field service.

1.02 MATERIALS

A. All materials incorporated in the project shall be new and shall fully comply with the specifications. Unless otherwise clearly provided in the specifications, all workmanship, equipment, materials, and articles incorporated in the work covered by the contract are to be of the best available grade of their respective kinds. Whenever, in the specifications, any material, article, device, product, fixture, form, type of construction, or process indicated or specified by patent or proprietary name, by name of manufacturer, or by catalog number, such specifications shall be deemed to be used for the purpose of establishing a standard of quality and facilitating the description of the material or process desired and shall be deemed to be followed by the words "or approved equal" and CONTRACTOR may in such case, upon receiving the ENGINEER's approval, purchase and use any item, type, or process which shall be substantially equal in every respect to that indicated or specified.

B. Materials and equipment may be used in the Work based upon receipt of a Supplier's certificate of compliance. Certificate must be in possession of CONTRACTOR and reviewed by ENGINEER prior to use.

C. Quality Assurance Testing by the OWNER and/or ENGINEER shall not relieve CONTRACTOR of responsibility to furnish materials and work in full compliance with Contract Documents.

1.03 MANUFACTURER'S INSTRUCTIONS

A. Should instructions conflict with Contract Documents, request clarification before proceeding.

B. When required in individual sections, submit manufacturer's instructions in the quantity required for product data, delivery, handling, storage, assembly, installation, start-up, adjusting, balancing, and finishing, as appropriate.

1.04 MANUFACTURER'S CERTIFICATES

A. When required in individual sections, submit manufacturer's certificate in duplicate executed by responsible officer certifying that product meets or exceeds specified requirements.

1.05 MANUFACTURER'S FIELD SERVICES

A. When required in individual sections, have manufacturer or Supplier provide qualified representative to observe field conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance of equipment as applicable and to make written report of observations and recommendations to ENGINEER.

1.06 WORKMANSHIP

A. Maintain performance control and supervision over Subcontractors, Suppliers, manufacturer's, products, services, workmanship, and site conditions, to produce work in accordance with Contract Documents.

B. Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.

C. Provide suitable qualified personnel to produce specified quality.

D. Ensure finishes match approved samples.

1.07 INSPECTION OF MATERIALS

A. At the option of the ENGINEER, materials to be supplied under this contract will be tested and/or inspected either at their place of origin or at the site of the work. CONTRACTOR shall give the ENGINEER written notification well in advance of actual readiness of materials to be tested and/or inspected at point of origin. Satisfactory tests and inspections at the point of origin shall not be construed as a final acceptance of the material nor shall it preclude retesting or reinspection at the site of the work.

B. CONTRACTOR shall furnish such samples of materials as are requested by the ENGINEER, without charge. No material shall be used until it has been approved by the ENGINEER. See Section 01300, CONTRACTOR's Submittal.

1.08 UNSATISFACTORY CONDITIONS

A. Examine areas and conditions under which materials and products are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to installer.

1.09 QUALITY CONTROL TESTING

A. ENGINEER's failure to detect any defective Work or materials does not prevent later rejection when such defect is discovered nor does it obligate ENGINEER for acceptance.

B. CONTRACTOR shall provide 24-hours minimum notice to ENGINEER for all testing required by these specifications.

1.10 TESTING ACCEPTANCE AND FREQUENCY

A. Minimum Quality Control Testing Frequency: As defined in Table 01440-1. The CONTRACTOR shall be responsible to ensure that testing is performed at the frequencies shown. CONTRACTOR shall uncover any work at no cost to OWNER to allow OWNER to perform required testing at the frequencies shown.

B. Acceptance of Defective Work: As defined in Article 9.6 of the General Conditions.

1.11 MEASUREMENT AND PAYMENT

A. Quality Control and Materials Testing required in Table 01440-1, is the responsibility of the OWNER.

TABLE 01440-1: QUALITY CONTROL TESTING FREQUENCY

SYSTEM or MATERIAL	TESTS	MINIMUM REQUIRED FREQUENCY
SUBGRADE AND BACKFILL MATERIALS		
Section 02221 Excavation and Backfill for Buried Pipelines	Field Density *	1 test per 300 linear feet per 1.5 feet of backfill thickness placed.
	Laboratory	1 test for each material type which includes proctor, classification and gradation.
Section 02222 Excavation and Backfill for Structures	Field Density *	1 test per 300 linear feet per 1.5 feet of backfill thickness placed.
	Laboratory	1 test for each material type which includes proctor, classification and gradation.
Section 02278 Road Base - Untreated Base Course	Field Density *	Base course subgrade: 1 tests per 8,000 square feet of area. Base course: 1 test per 8,000 square feet of area.
	Laboratory	Base course: 1 test for each material type which includes proctor, classification and gradation.
ASPHALT		
Section 02500 Removal and Replacement of Surface Improvements	Mix Design	Marshall Test Method: 1 test initially per each type of material and each change in target, and for each day of production thereafter. Specific Gravity: 1 per each Marshall Test Extraction: 1 test per each Marshall Test
	Field Density *	Bituminous surfaces: 1 test per 8,000 square feet placed or part thereof.
	Asphalt Thickness and Core Density	Bituminous surfaces: 1 test sample every 300 linear feet of completed roadway.

PORTLAND CEMENT CONCRETE		
Section 03300 Cast-in-Place Concrete	Slump	1 test every day of placement or 1 test for every 50 cubic yards and more frequently if batching appears inconsistent. Conduct with strength tests.
	Entrained air	1 test with slump test.
	Ambient and concrete tem-peratures	1 test with slump test.
	Water cement ratio.	to be verified and provided with batch tickets.
	Compressive strength	1 set of 4 cylinders every 50 c.y. or part thereof per day.

NOTES:

1 Additional tests shall be conducted when variations occur due to the contractor's operations, weather conditions, site conditions, etc.

2 Classification, moisture content, Atterberg limits and specific gravity tests shall be conducted for each compaction test if applicable.

3 Tests can substitute for same tests required under "Aggregates" (from bins or source), although gradations will be required when blending aggregates.

4 Aggregate moisture tests are to be conducted in conjunction with concrete strength tests for water/cement calculations.

5. * All nuclear density meters used for in place field testing shall have been calibrated by ASTM methods within 1 year previous to current testing.

SECTION 01500

TEMPORARY CONSTRUCTION UTILITIES AND ENVIRONMENTAL CONTROLS

PART 1 GENERAL

1.01 DESCRIPTION

A. This section covers temporary utilities, including electricity, lighting, telephone service, water, and sanitary facilities; temporary controls, including barriers, protection of work, and water control; and construction facilities, including parking, progress cleaning, and temporary buildings.

1.02 TEMPORARY UTILITIES

A. Temporary Electricity: CONTRACTOR shall provide, maintain, and pay for all power required by CONTRACTOR, including electrical service to CONTRACTORS field office.

B. Temporary Lighting: CONTRACTOR shall provide all temporary lighting required for prosecution of his work and for employee and public safety. As a minimum, lighting levels during working hours shall meet the requirements of U.O.S.H.A. Subsection 1926.56 illumination.

C. Telephone Service: CONTRACTOR shall provide, maintain and pay for telephone service to the field office.

D. Temporary Water Service

1. CONTRACTOR shall provide for all his workers on the project, adequate and reasonably convenient uncontaminated drinking water supply. All facilities shall comply with the regulations of the local and State Departments of Health.

2. CONTRACTOR shall be responsible to arrange for water, both potable and non-potable water.

3. When water is taken from a city water system or any other potable water supply source for construction purposes, suitable precautions shall be taken to prevent cross connections and contamination of water supply.

E. Temporary Sanitary Facilities: CONTRACTOR shall provide and maintain sanitary facilities for his employees and his subcontractors' employees that will comply with the regulations of the local and State Departments of Health.

1.03 TEMPORARY CONTROLS

A. Barriers: Provide barriers as necessary to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.

B. Dust Control: Execute Work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into the atmosphere. Give all unpaved streets, roads, detours, or haul roads used in the construction area an approved dust-preventive treatment or periodically water to prevent dust. Applicable environmental regulations for dust prevention shall be strictly enforced. **CONTRACTOR shall submit a Fugitive Dust Control Plan to the Division of Air Quality, which meets all state requirements (R307-309-4).**

C. Protection of Work: CONTRACTOR shall protect installed work and provide special protection where specified in individual specifications sections. CONTRACTOR shall provide temporary and removable protection for installed products, and shall control activity in immediate work area to minimize damage.

D. Open Burning: No open burning of waste materials will be allowed.

E. Explosives and Blasting: The use of explosives on the work will not be permitted.

F. Noise Abatement: In inhabited areas, particularly residential, operations shall be performed in a manner to minimize unnecessary noise generation.

G. Storm & Ground Water

1. CONTRACTOR shall provide and maintain at all times during construction, ample means and devices with which to promptly remove and properly dispose of all water entering the excavation or other parts of the work, whether the water be surface or underground water.

2. In excavation, fill, and grading operations, care shall be taken to disturb the pre-existing drainage pattern as little as possible. Particular care shall be taken not to direct drainage water into private property or into streets or drainageways inadequate for the increased flow.

3. CONTRACTOR shall maintain effective means to minimize the quantity of sediments leaving the work area either by storm water or CONTRACTOR's own dewatering operations.

H. Traffic Control: shall be the responsibility of the CONTRACTOR along any road where potential exists for traffic disruption. CONTRACTOR shall assume responsibility for materials (including barricades, flagging, signage, personnel safety equipment, etc., including storage and handling of materials), labor, equipment and incidentals required to control traffic flow for the duration of the project in accordance with all applicable local, state and federal regulations. The CONTRACTOR shall be responsible to obtain a traffic control permit from the City, and have such permit in place prior to beginning any work which impacts traffic.

1.04 CONSTRUCTION FACILITIES

A. Parking: CONTRACTOR shall provide temporary parking areas to accommodate use of construction personnel. Parking shall be located in an area approved by the ENGINEER.

B. Progress Cleaning

1. CONTRACTOR shall maintain areas free of waste materials, debris, and rubbish. Maintain the site in a clean and orderly condition. Upon completion of work, repair all damage caused by equipment and leave the project free of rubbish or excess materials of any kind.

2. Thoroughly clean all spilled dirt, gravel, or other foreign materials caused by the construction operations from all streets and roads at the conclusion of each day's operation.

3. It shall be the responsibility of CONTRACTOR to promptly clean up and remove any oil and or fuel spills caused by CONTRACTOR or his Sub-contractors during the course of the project. Contaminated soil shall be properly disposed of by CONTRACTOR in accordance with all applicable laws. CONTRACTOR shall be responsible for any damages to OWNER resulting from CONTRACTOR's negligence in promptly cleaning up said spills.

1.05 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Prior to Final Application for Payment, CONTRACTOR shall remove temporary above grade or buried utilities, equipment, facilities, and materials; clean and repair

damage caused by installation or use of temporary work; and restore existing facilities used during construction to original condition.

1.06 CHEMICALS

A. All chemicals used during construction or furnished for project operation whether defoliant, soil sterilant, herbicide, pesticide, disinfectant, polymer, reactant or of other classification, shall show approval of the U.S. Department of Agriculture. Use of all such chemicals and disposal of residues shall be in strict accordance with the printed instruction of the manufacturer.

1.07 CULTURAL RESOURCES

A. The CONTRACTOR's attention is directed to the National Historic Prevention Act of 1966 (16 U.S.C. 470) and 36 CFR 800 which provides for the preservation of potential historical architectural, archeological, or cultural resources (hereinafter called "cultural resources").

B. The CONTRACTOR shall conform to the applicable requirements of the National Historic Preservation Act of 1966 as it relates to the preservation of cultural resources.

C. In the event potential cultural resources are discovered during subsurface excavations at the site of construction, the following procedures shall be instituted:

1. The ENGINEER will issue a Field Order directing the CONTRACTOR to cease all construction operations at the location of such potential cultural resources find.

2. Such Field Order shall be effective until such time as a qualified archeologist can be called to assess the value of these potential cultural resources and make recommendations to the OWNER and ENGINEER.

D. If the archeologist determines that the potential find is a bona fide cultural resource, at the direction of the ENGINEER, the CONTRACTOR shall suspend work at the location of the find under the provisions for changes contained in Articles 10, 11, and 12 of the General Conditions, Section 00700.

1.08 MEASUREMENT AND PAYMENT

A. Temporary Utilities and Facilities shall not be measured or paid as a separate item, but shall be included as part of the various items to which it relates.

- END OF SECTION -

SECTION 01505

MOBILIZATION

PART 1 GENERAL

1.01 GENERAL

A. This Section is provided to cover CONTRACTOR's cost of general and miscellaneous responsibilities and operations not normally attributed to, or included in, any other single bid item. This shall include, but not necessarily be limited to, work described or enumerated in this section under the following subsections.

1.02 MOVING TO AND FROM THE JOB SITE

A. This shall include CONTRACTOR's preliminary arrangement for starting and stopping construction operations, work schedules, and transportation of equipment and personnel to and from the project.

1.03 CLEAN-UP

A. The cost of all clean-up work as specified and not covered under other items shall be included in the lump-sum price for "Mobilization".

1.04 TEMPORARY UTILITIES

A. The cost of water, power, etc. required by CONTRACTOR in performing the work specified in the contract shall be included in the lump-sum price for "Mobilization".

1.05 PERFORMANCE BOND, PAYMENT BOND, AND INSURANCE

A. The cost of the performance bond, payment bond, and any required insurance and/or other miscellaneous cost associated with this project that is not found on the Bid Schedule shall be paid for under mobilization.

1.06 TEMPORARY FACILITIES

A. CONTRACTOR shall provide and maintain a temporary field office on the project site.

B. CONTRACTOR shall provide for all his workers on the project, adequate and reasonably convenient uncontaminated drinking water supply and temporary toilet facilities. All facilities shall comply with the Utah Safety and Health Act.

C. CONTRACTOR shall make arrangements for, secure, and pay for any and all utility supplies such as electric power, water, natural gas, or telephone that may be required for prosecution of the work.

D. CONTRACTOR shall provide all temporary lighting required for prosecution of his work and for employee and public safety. As a minimum, lighting levels during working hours shall meet the requirements of U.O.S.H.A. Subsection 1926.56 illumination.

1.07 ENGINEER'S OFFICE

A. CONTRACTOR is not required to supply an ENGINEER's Office.

1.08 PERMITS

A. CONTRACTOR shall provide all necessary permits for completion of the work (See General Conditions Section 3.5).

1.09 MEASUREMENT AND PAYMENT

A. Paid in accordance with Section 01025 - Measurement and Payment.

- END OF SECTION -

SECTION 01530

PROTECTION OF EXISTING FACILITIES

1.01 GENERAL

A. Any existing facilities, disturbed which are located in or adjacent to the line of work such as curbs, gutters, drive approaches, sidewalks, driveways, fences, underground pipes, conduits, or utilities, shall be cleaned up and restored in kind by the CONTRACTOR and in accordance with the specifications contained herein governing the various types of services involved.

1.02 RESTORATION OF FENCES

A. Where it is necessary to remove any fence to facilitate the CONTRACTOR's operation, the CONTRACTOR shall obtain prior agreement with the Owner for removal of the fence, and shall be responsible for any damage due to negligence of the CONTRACTOR. As soon as practical, the fence shall be restored substantially to the same or improved condition as it was prior to the commencement of the work.

1.03 INTERFERING STRUCTURES AND UTILITIES

A. The CONTRACTOR shall exercise all possible caution to prevent damage to existing structures and utilities, whether above ground or underground. It shall be the responsibility of the CONTRACTOR to locate and expose all existing underground and overhead structures and utilities in such a manner as to prevent damage to same. The CONTRACTOR shall notify all utility offices concerned at least 48 hours in advance of construction operations in which a utility agency's facilities may be involved. This shall include, but not be limited to, irrigation water, culinary water, sanitary sewer, telephone, gas, and electric. The CONTRACTOR shall be responsible for any and all changes to, reconnections to public utility facilities encountered or interrupted during prosecution of the work, and all costs relating hereto shall be at the CONTRACTOR's expense. The CONTRACTOR shall contract with and pay Public Utility Agencies for work required in connection with all utility interferences and handle all necessary notifications, scheduling, coordination, and details. The cost of public utility interferences shall be included in the CONTRACTOR's lump sum or unit price bid covering the major contract facility to which interference or changes are attributable.

B. Any damages to private property, either inside or outside the limits of the easements provided by the OWNER, shall be the responsibility of the CONTRACTOR. Any roads, structures, or utilities damaged by the work shall be repaired or replaced in a condition equal to or better than the condition prior to the damage. Such repair or replacement shall be accomplished at the CONTRACTOR's expense without additional compensation from the OWNER.

C. The CONTRACTOR shall remove and replace small miscellaneous structures such as fences and culverts which are damaged by the construction activity at his own expense without additional compensation from the OWNER. The CONTRACTOR shall replace these structures in a condition as good as or better than their original condition.

D. The CONTRACTOR shall saw cut the edge of existing drive approaches, where necessary, to prevent their damage during removal and replacement of the adjacent asphalt surface. Drive approaches which are damaged by the construction activity shall be repaired by the CONTRACTOR at his own expense without additional compensation from the OWNER. The CONTRACTOR shall replace these structures in a condition as good as or better than their original condition.

E. At points where the CONTRACTOR's operations are adjacent to or across properties of railway, telegraph, telephone, irrigation canal, power, gas, water, or adjacent to other property (damage to which might result in considerable expense, loss, and inconvenience), no work shall be started until all arrangements necessary for the protection thereof have been made.

F. The locations of the major existing culinary water lines, gas pipes, underground electric, cable television, and telephone lines that are shown on the plans, were taken from city maps, and maps supplied by the utility owner. Preliminary investigations have indicated they are generally reliable. However, it should be expected that some location discrepancies will occur. Neither the OWNER nor its officers or agents shall be responsible for damages to the CONTRACTOR as a result of the locations of the utilities being other than those shown on the plans or for the existence of utilities not shown on the plans.

G. The CONTRACTOR shall be solely and directly responsible to the owners and operators of such properties for any damage, injury, expense, loss or inconvenience, delay, suits, actions, or claims of any character brought because of an injury or damage which may result from the carrying out of the work to be done under the contract.

H. In the event of interruption to either domestic or irrigation water, or to other utility services as a result of accidental breakage, or as a result of being exposed or unsupported, the CONTRACTOR shall promptly notify the proper authority. The CONTRACTOR shall cooperate with the authority in restoration of service as soon as possible, and shall not allow interruption of any water or utility service outside working hours unless prior approval is received.

I. Existing drainage ditches are owned and operated by a third party; not the OWNER. These drainage ditches must be maintained by the CONTRACTOR during construction. Where these drainage ditches must be crossed for utility installation, they must be restored upon completion to their existing condition (See Section 2500 - Removal and Replacement of Surface Improvements). The CONTRACTOR shall consult with ENGINEER if conflicts or questions arise during construction.

1.04 RIGHTS-OF-WAY

A. The CONTRACTOR shall be required to confine construction operations within the dedicated rights-of-way for public through fares, or within areas for which construction easements have been obtained, unless they have made special arrangements with the affected property owners in advance. The CONTRACTOR shall be required to protect stored materials, cultivated trees and crops, and other items adjacent to the proposed construction site.

B. The CONTRACTOR shall submit for approval by the ENGINEER the type and size of equipment used, and the methods for work performed on the rights-of-way across private properties, to avoid or minimize injury to trees, shrubs, gardens, lawns, fences, driveways, retaining walls, or other improvements within the rights-of-way.

C. Property owners affected by the construction shall be notified by the CONTRACTOR at least 48 hours in advance of the time the construction begins. During all construction operations, the CONTRACTOR shall construct and maintain such facilities as may be required to provide access by all property owners to their property. No person shall be cut off from access to his property for a period exceeding 8 hours unless the CONTRACTOR has made special arrangements with

the affected persons. The CONTRACTOR shall, daily or more frequently if necessary, grade all disturbed areas to be smooth for motor vehicle traffic.

1.05 MEASUREMENT AND PAYMENT

A. Protection of existing facilities shall not be measured or paid as a separate item, but shall be included as part of the various items to which it relates.

- END OF SECTION -

SECTION 01550

JOB CONDITIONS

PART 1 GENERAL

1.01 SITE INVESTIGATION

A. CONTRACTOR acknowledges that he has satisfied himself as to the nature and location of the work; the general and local conditions, particularly those bearing upon availability of transportation, access to the site, disposal, handling and storage of materials, availability of labor, water, electric power, roads, and uncertainties of weather, river stages, or similar physical conditions at the site; the conformation and conditions of the ground; the character of equipment and facilities needed preliminary to and during the prosecution of the work; and all other matters which can in any way affect the work or the cost thereof under this Contract.

1. CONTRACTOR further acknowledges that he has satisfied himself as to the character, quality, and quantity of surface and subsurface materials to be encountered from his inspection of the site and from reviewing any available records of exploratory work furnished by OWNER or included in these Documents. Failure by CONTRACTOR to acquaint himself with the physical conditions of the site and all the available information will not relieve him from responsibility for properly estimating the difficulty or cost of successfully performing the work.

2. CONTRACTOR warrants that as a result of his examination and investigation of all the aforesaid data that he can perform the work in a good and workmanlike manner and to the satisfaction of OWNER. OWNER assumes no responsibility for any representations made by any of its officers or agents during or prior to the execution of this Contract, unless (1) such representations are expressly stated in the Contract, and (2) the Contract expressly provides that the responsibility therefore is assumed by OWNER.

B. STREET USE. Nothing herein shall be construed to entitle CONTRACTOR to the exclusive use of any public street, alleyway, or parking area during the performance of the work hereunder, and CONTRACTOR shall so conduct operations as not to interfere unnecessarily with the authorized work of utility companies or other agencies in such streets, alleyways, or parking areas. No street shall be closed to the public without first obtaining permission of the ENGINEER and proper governmental authority.

1.02 CONTRACTOR'S WORK AND STORAGE AREA

A. CONTRACTOR shall make arrangements for any offsite storage or shop areas necessary for the proper execution of the work.

1.03 MEASUREMENT AND PAYMENT

A. Job conditions shall not be measured or paid as a separate item, but shall be included as part of the various items to which it relates.

- END OF SECTION -

SECTION 01700

PROJECT CLOSEOUT

PART 1 GENERAL

1.01 FINAL CLEANUP

A. CONTRACTOR shall promptly remove from the vicinity of the completed work, all rubbish, unused materials, concrete forms, construction equipment, and temporary structures and facilities used during construction. Final acceptance of the work by OWNER will be withheld until CONTRACTOR has satisfactorily complied with the foregoing requirements for final cleanup of the project site.

1.02 TOUCH-UP AND REPAIR

A. CONTRACTOR shall touch up or repair all finished surfaces on structures, equipment, fixtures, or whatever, that have been damaged prior to final acceptance. Surfaces on which such touch-up or repair cannot be successfully accomplished shall be completely refinished or in the case of hardware and similar small items, the item shall be replaced.

1.03 CLOSEOUT TIMETABLE

A. CONTRACTOR shall establish dates for equipment testing, acceptance periods and on-site instructional periods (as required under the Contract). Such dates shall be established not less than one week prior to beginning any of the foregoing items, to allow OWNER, the ENGINEER, and their authorized representatives sufficient time to schedule attendance at such activities.

1.04 OPERATION AND MAINTENANCE MANUAL SUBMITTALS

A. CONTRACTOR's attention is directed to the condition that any monies due CONTRACTOR as progress payments shall be retained if at the 75 percent construction completion point, the approved technical manuals have not been submitted in accordance with Section 01300 entitled "Contractor Submittals" of the Technical Specification. The aforementioned amount will be retained by OWNER until the technical manuals have been submitted. Any such retention of money for failure to submit the approved technical manuals on or before the 75 percent construction completion point shall be in addition to the retention of any payments due to CONTRACTOR as specified in Article 8 of the General Conditions.

1.05 MAINTENANCE AND GUARANTEE

A. CONTRACTOR shall comply with the maintenance and guarantee requirements contained in Article 9 of the General Conditions.

B. Replacement of earth fill or backfill, where it has settled below the required finish elevations, shall be considered as part of such required repair work, and any repair or resurfacing which becomes necessary by reason of such required repair work shall be completed by CONTRACTOR at no cost to OWNER.

C. CONTRACTOR shall make all repairs and replacements promptly upon receipt of written order from OWNER. If CONTRACTOR fails to make such repairs or replacement promptly, OWNER reserves the right to do the work and CONTRACTOR and his surety shall be liable to OWNER for the cost thereof.

D. The CONTRACTOR shall obtain a signed release from the property owner approving restoration of work in the construction easements across or bordering private property.

1.06 FINAL ACCEPTANCE

A. Final acceptance and final payment shall not be made until all provisions of the General Conditions Article 8 have been satisfied.

1.07 MEASUREMENT AND PAYMENT

A. Project closeout shall not be measured or paid as a separate item, but shall be included as part of the various items to which it relates.

- END OF SECTION -

SECTION 02140

DEWATERING

PART 1 - GENERAL

1.01 DESCRIPTION

A. **Scope**

The section provides specifications for dewatering systems and appurtenances to be used during construction. Groundwater is expected to be encountered in the project site and may vary from the depth shown on boring logs. Refer to boring logs in the geotechnical report.

B. **Type**

This specification covers the use of site sump pumping, well pointing, vertical sand drains, and deep well drainage systems.

1.02 QUALITY ASSURANCE

Before dewatering is commenced, the Contractor shall obtain the acceptance of the Owner and Engineer for the method, installation and details of the dewatering system he proposes to use. To that end, the Contractor shall submit to the Owner and Engineer plans setting forth the details of his proposed dewatering systems. The dewatering system plans shall be in sufficient detail to indicate sizes of pumps, piping, appurtenances, the ultimate disposal point for water and to permit the Owner and Engineer to judge the overall completeness and effectiveness of the proposed system.

The control of groundwater shall be such that softening of the bottom of excavations, or formation of "quick" conditions or "boils," does not occur. Dewatering systems shall be designed and operated so as to prevent removal of the natural soils.

The Contractor shall select the particular method of dewatering to be employed.

PART 2 - METHODS

2.01 GENERAL

The Contractor shall furnish, install, operate and maintain all machinery, appliances, and equipment to maintain all excavations free from water during construction, and shall dewater and dispose of the water so as not to cause injury to public or private property, or to cause a nuisance or menace to the public.

The dewatering system shall be installed and operated so that the groundwater level outside the excavation is not reduced to the extent which would cause damage or endanger adjacent structures.

The static water level shall be drawn down below the bottom of the excavation to maintain the undisturbed state of the foundation soils and to facilitate in proper construction methods.

2.02 SUMP PUMPING

Sumps shall be at the low point of excavation. Excavation shall be graded to drain to the sumps.

2.03 WELL POINTS

The annular space between the pipe and the borehole of the well point shall be sealed near the top of the well point to prevent vacuum leaks. Installation shall be carried out in such a way so as not to excessively disturb in situ material.

2.04 DEEP WELLS

Deep wells shall be cased with PVC, steel, or other suitable casing material. The casing shall have a perforated section at the water producing zone. The annular zone between the casing and the bore hole may be gravel packed. Installation shall be carried out by any acceptable method.

2.05 VERTICAL SAND DRAINS

Vertical sand drains shall be installed with minimum disturbance to in situ material.

PART 3 - EXECUTION

3.01 GENERAL

One hundred percent standby pumping capacity shall be available on site at all times and shall be connected to the dewatering system piping to permit immediate use. In addition, standby ancillary equipment and appurtenances for all ordinary emergencies, and competent workmen for operation and maintenance of all dewatering equipment shall be on site at all times. Standby equipment shall include emergency power generation and automatic switchover to the emergency generator when normal power fails.

Dewatering systems shall not be shut down between shifts, on holidays, on weekends, or during work stoppages.

The Contractor shall control surface water to prevent entry into excavations.

At each excavation a sufficient number of temporary observation wells to continuously check the groundwater level shall be provided.

3.02 RELEASE OF GROUNDWATER

The release of surface water from the wetland area shall be performed in such a manner as to maintain the undisturbed state of the natural foundation soils, prevent disturbance of compacted backfill, and prevent flotation or movement of structures, pipelines and sewers.

-END OF SECTION-

SECTION 02210

SITE GRADING

PART 1 GENERAL

1.01 DESCRIPTION

A. This section covers site grading.

1.02 RELATED WORK

A. Related work specified in other sections:

Section 01440 - Quality Control and Materials Testing
Section 01500 - Temporary Construction Utilities & Environmental Controls
Section 02222 - Excavation and Backfill for Structures

1.03 REFERENCES

A. The latest edition of the following publications form a part of this specifications to the extent referred. The publication are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 422-	Particle-Size Analysis of Soils
ASTM D 698-	Test Method of Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5.5 lb. (2.5-kg) Rammer and 12-in. (305-mm) Drop
ASTM D 1556-	Density of Soil in Place by the Sand-Cone method
ASTM D 1557-	Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb (4.54-kg) Rammer and 18-in. (457-mm) Drop
ASTM D 2487-	Classification of Soils for Engineering Purposes
ASTM D 2922-	Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017-	Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)

1.04 MEASUREMENT AND PAYMENT

A. Measurement and payment for general site grading shall not be paid as a unit item (See Section 01025 - Measurement and Payment), but shall be paid for under the item in the Bid Schedule to which it pertains.

PART 2 PRODUCTS

2.01 STRUCTURAL FILL MATERIAL

A. Structural fill materials as part of the concrete liner system for the irrigation ponds shall be non-expansive granular soil with less than 15 percent passing the No. 200 sieve and a maximum size of not greater than 2 inches.

B. Fill material shall be free from frozen lumps, rocks larger than 2 inches in the larger dimension, roots, trash, lumber, deleterious or organic material. Suitability of material for embankment in accordance with these criteria will be as determined by the ENGINEER.

C. If required to furnish additional quantities of fill material from off-site sources, CONTRACTOR shall not borrow materials from adjacent private or public lands without providing to OWNER written verification of such approval from the appropriate land owner or agency. CONTRACTOR shall be responsible for all costs associated with providing additional quantities of embankment fill as may be required to complete the work described herein and as shown on the drawings.

PART 3 EXECUTION

3.01 GENERAL

A. Grading shall produce uniform grades or slopes between spot elevations or contours shown.

B. Areas of construction activity shall be left in condition of uniform grade, blending into pre-existing contours and concealing, as much as possible, evidence of construction activity by back dragging or raking to conceal tire marks. Revegetation shall not be performed until the subgrade is acceptable to OWNER.

C. All excess and unsuitable excavated materials shall be removed from the project site and disposed of by CONTRACTOR to a site specified by the OWNER, and subject

to specific regulations imposed by laws and ordinances and in a manner that will not create a public nuisance nor result in unsightly conditions. CONTRACTOR shall assume full responsibility for acceptable disposition of the material as well as for any damages resulting from his disposal operations.

3.02 SITE PREPARATION

A. Care shall be taken not to disturb the natural soil which is to remain below the proposed concrete liner.

B. Prior to placing grading fill or concrete; any loose or disturbed soil, topsoil or organics shall be removed. The subgrade shall be proof-rolled to identify soft areas. Soft areas shall be removed and replaced with compacted granular fill containing less than 15 percent passing the No. 200 sieve.

C. Embankment shall include the placement of materials to raise the grade to the established elevations indicated and the construction of driving surfaces, taking into consideration the required thicknesses for base course material and asphalt paving or concrete.

D. Embankment material shall be placed in no more than 6-inch loose lifts.

E. All embankment fill material beneath concrete flatwork, pavement and driving surfaces shall be placed and compacted to at least 90% of maximum dry density as determined by ASTM D-1557 at a moisture content within plus two percent to minus two percent of optimum.

F. Where the moisture content is not suitable and/or sufficient compaction has not been obtained, the fill shall be reconditioned to an approved moisture content and recompacted to the minimum required compaction.

G. Unless otherwise specified, CONTRACTOR shall be responsible for arranging for the placing and compacting of approved fill material in accordance with these Specifications. If the Soils Testing Agency should determine that CONTRACTOR is failing to meet the minimum requirements, CONTRACTOR shall stop operations and make adjustments as necessary to produce a satisfactorily compacted fill at no additional cost to OWNER.

3.03 GRADING

A. The final grade of all completed areas shall be between zero and minus two-tenths (-0.2) of a foot from the grade designated on the drawings.

3.04 COMPACTION TESTS

A. Compaction Quality Control Testing shall be the provided and paid for by the OWNER in accordance with Section 01440. A minimum 24 hours (or as otherwise specified) notice must be given to schedule all tests to provide scheduling of tests by the ENGINEER.

B. It shall be the responsibility of the CONTRACTOR to accomplish the specified compaction for fill and other earthwork. It shall be the responsibility of the CONTRACTOR to control his operations by performing any additional tests necessary to verify and confirm that CONTRACTOR has complied, and is complying at all times, with the requirements of these Specifications concerning compaction, control, and testing.

1. Testing of Fill Materials

a. Characteristics of fill materials shall be determined in accordance with the requirements of Section 01440.

b. The CONTRACTOR shall demonstrate the adequacy of compaction equipment and procedures before exceeding the first lift for embankment fill materials.

c. Until the specified degree of compaction on the previously specified amounts of earthwork is achieved, no additional earthwork of the same kind shall be performed.

d. Periodic compliance tests may be made by the ENGINEER to verify that compaction is meeting the requirements previously specified at no cost to the CONTRACTOR.

e. If compaction fails to meet the specified requirements, the CONTRACTOR shall remove and replace the embankment fill at proper density or shall bring the density up to specified level by other means acceptable to the ENGINEER. Subsequent tests required to confirm and verify that the reconstructed embankment fill has been brought up to specified density shall be paid by the CONTRACTOR. The CONTRACTOR's confirmation tests shall be performed in a manner acceptable to the ENGINEER. Frequency of confirmation

tests for remedial work shall be double that amount specified for initial confirmation tests.

2. Field Density Tests

a. Tests shall be performed in sufficient numbers to meet the requirements of Section 01440 and to ensure that the specified density is being obtained.

b. Quality Assurance Confirmation tests performed by ENGINEER shall be paid by the OWNER.

C. Field density tests shall be made in accordance with ASTM D-1557.

- END OF SECTION -

SECTION 02222

EXCAVATION AND BACKFILL FOR STRUCTURES

PART 1 GENERAL

1.01 DESCRIPTION

A. This section covers excavating, backfilling and compacting for structures as directed by ENGINEER.

1.02 RELATED WORK

A. Related work specified in other sections:

Section 01440 - Quality Control and Materials Testing
Section 01500 - Temporary Construction Utilities and Environmental Controls
Section 02140 - Dewatering
Section 02210 - Site Grading
Section 03300 - Cast-in-Place Concrete

1.03 REFERENCES

A. The latest edition of the following publications form a part of this specifications to the extent referred. The publication are referred to in the text by basic designation only.

AASHTO T 88-	Particle Size Analysis of Soils
AASHTO T 180-	Moisture-Density Relations of Soils Using a 10-lb. (4.54 kg) Rammer and an 18-in (457 mm) Drop
AASHTO T 191-	Density of Soil In-Place by the Sand-Cone Method
AASHTO T 205-	Density of Soil In-Place by the Rubber-Balloon Method
AASHTO T 238-	Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
AASHTO T 239-	Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 422-	Particle-Size Analysis of Soils
ASTM D 698-	Test Method of Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5.5 lb. (2.5-kg) Rammer and 12-in. (305-mm) Drop

ASTM D 1556-	Density of Soil in Place by the Sand-Cone method
ASTM D 1557-	Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb (4.54-kg) Rammer and 18-in. (457-mm) Drop
ASTM D 2487-	Classification of Soils for Engineering Purposes
ASTM D 2922-	Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017-	Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 4318-	Liquid Limit, Plastic Limit, and Plasticity Index of Soils

B. The latest Edition of the State of Utah Standard Specification for Road and Bridge Construction.

C. The latest Edition of the American Public Works Association (APWA) and Associated General Contractors of America Standard Plans and Standard Specifications.

1.04 SUBMITTALS

A. If requested by the ENGINEER, the CONTRACTOR shall furnish a certified test result from an approved laboratory showing that the free draining gravel material and granular backfill material conforms to the Specification requirements at no additional cost to the OWNER.

B. The following shall be submitted in accordance with Section 01300 Contractor Submittals:

1. Laboratory test results showing that the free draining gravel material and structural fill material conforms to the Specification requirements.

2. Copies of Field Density Test reports shall be submitted to the ENGINEER or OWNER's RPR at the beginning of each work day for the previous day's testing of subgrades, gravel and structural fill.

1.05 DEFINITIONS

A. **Backfill**

Material used in refilling a cut, trench or other excavation.

B. **Bedrock**

Bedrock consists of solid geologic formations underlying unconsolidated surface materials.

C. **Compaction**

The process of mechanically stabilizing a material by increasing its density at a controlled moisture condition. "Degree of Compaction" is expressed as a percentage of the maximum density obtained by the test procedure described in ASTM D1557 for general soil types abbreviated in this specification, for example as "XX% ASTM D1557 maximum density" or "XX% compaction."

D. **Colluvium**

Unconsolidated surficial soils overlying bedrock.

E. **Competent Material**

Competent material shall be defined as material that is suitable for supporting the intended loads. Determination of competent material will be done by a representative of the Construction Manager employed by the Construction Manager to inspect construction. Factors in determining competent material include the degree of fracturing, hardness, bearing capacity, and any other factors that affect the suitability of the soil.

F. **Excavation**

The removal of soil to obtain a specified depth or elevation.

G. **Fill, Engineered Fill or Embankment**

Specified material placed at a specified degree of compaction and moisture content to obtain an indicated grade or elevation.

H. **Structural Foundation Fill**

Material used in refilling the area below the structural foundation and the base of the excavation.

I. **Structural Backfill**

Material used in refilling a cut or other excavation between undisturbed sides of the excavation and below grade walls.

J. **Lift**

Layer (or course) of soil placed on top of a previously prepared or placed soil in a fill or embankment.

K. **Rock**

Rock is defined as material that cannot be ripped with a caterpillar tractor (D-9) and single ripper.

Where trenching is necessary, and a caterpillar tractor ripper cannot reach into the excavation, rock shall be defined as material that cannot be excavated with a track mounted 235 Caterpillar backhoe with narrow bucket and teeth.

The Construction Manager shall make the determination as to whether material is classified as rock.

L. **Subgrade**

The uppermost layer of material (sometimes in situ soil or rock) graded or otherwise prepared for supporting the addition of base material, fill material, or structural foundation materials.

M. **Unsuitable Material**

Existing in-place soil, unstable material, substandard fill or backfill material, or other material designated by the Construction Manager as having insufficient strength characteristics or stability to carry intended loads in fill or embankment without excessive consolidation or loss of stability. As a minimum, materials classified as

PT, OH, or OL by ASTI D2487 are unsuitable. Also, material containing refuse, large rocks, debris, and other material which could cause backfill not to compact shall be considered unsuitable.

N. **Unyielding Material**

Rock, rib, ridge, rock protrusion, or solid with cobbles in the trench bottom requiring a covering of finer grain material or special bedding to avoid bridging in the pipe or conduit.

O. **Optimum Moisture Content**

Optimum moisture content shall be determined in accordance with ASTM D1557. Field moisture content shall be determined on the basis of the fraction of material passing the 3/4 in. sieve.

1.06 MEASUREMENT AND PAYMENT

A. Excavation and Backfill for Structures shall be measured or paid as a separate item.

PART 2 PRODUCTS

2.01 STRUCTURAL FILL

A. Structural fill material placed below concrete liner shall be non-expansive granular soil with less than 5 percent passing the No. 200 sieve, a maximum size of not greater than 3-inches, and a liquid limit of less than 30 percent.

PART 3 EXECUTION

3.01 EXCAVATION

A. Excavation shall be performed to the lines and grades indicated. Excavated material not required or not satisfactory for backfill shall be removed from the site

3.02 BACKFILL

A. Backfill and structural fill material shall not be placed against concrete structure that have not been properly cured

B. Backfill and structural fill material shall be placed in no more than 6-inch loose lifts.

C. Structural fill placed beneath concrete slab shall be placed and compacted to at least 95 percent of maximum dry density at a moisture content within 2 percent of optimum moisture content in accordance with ASTM D-1557.

D. All other backfill material shall be placed and compacted to at least 90 percent of maximum dry density at a moisture content within 2 percent of optimum moisture content in accordance with ASTM D-1557.

E. Where the moisture content is not suitable and/or sufficient compaction has not been obtained, the fill shall be reconditioned to an approved moisture content and recompacted to the minimum required compaction prior to placing any additional fill material.

F. Unless otherwise specified, the CONTRACTOR shall be responsible for arranging for the placing and compacting of approved fill material in accordance with these Specifications. If the Testing Agency should determine that the CONTRACTOR is failing to meet the minimum requirements, the CONTRACTOR shall stop operations and make adjustments as necessary to produce a satisfactorily compacted fill at no additional cost to the OWNER.

G. Sufficient personnel, equipment, sumps or other means should be provided to maintain the site in an acceptable dry condition for the duration of this contract.

H. Excavations shall be so braced and supported as needed to prevent the ground, adjacent to the excavation, from sliding or settling. Localized slides or settlements shall be promptly removed and corrected by the CONTRACTOR.

3.03 REMOVAL OF WATER

A. The CONTRACTOR shall provide and maintain at all times ample means and devices with which to remove promptly and to properly dispose of all water entering the trench excavation.

B. Water shall be disposed of in a suitable manner without damage to adjacent property or without being a menace to public health and convenience. No water shall be drained into work built or under construction without prior consent of the ENGINEER.

C. Dewatering shall be accomplished by well points, sumping, or any other acceptable method which will insure a dewatered trench. Any dewatering method shall be subject to the approval of the ENGINEER.

D. CONTRACTOR shall obtain all necessary permits required for discharge of water.

3.04 FINISHED GRADE

A. The finished subgrade and grade of the fill shall not vary more than 0.05 feet from the established grades and cross-sections shown on the Drawings.

3.05 COMPACTION TESTS

A. Compaction Quality Control Testing shall be the provided and paid for by the CONTRACTOR in accordance with Section 01440. A minimum of 24 hours (or as otherwise specified) notice must be given to schedule all tests.

B. It shall be the responsibility of the CONTRACTOR to accomplish the specified compaction for backfill, structural fill, and other earthwork. It shall be the responsibility of the CONTRACTOR to control his operations by performing any additional tests necessary to verify and confirm that CONTRACTOR has complied, and is complying at all times, with the requirements of these Specifications concerning compaction, control, and testing.

1. Testing of Backfill Materials

a. Characteristics of backfill materials shall be determined in accordance with the requirements of Section 01440.

b. The CONTRACTOR shall demonstrate the adequacy of compaction equipment and procedures before exceeding any of the following amounts of earthwork quantities:

(1) One (1) test per 1.5 feet of backfill thickness placed per structure.

c. Until the specified degree of compaction on the previously specified amounts of earthwork is achieved, no additional earthwork of the same kind shall be performed.

d. After satisfactory conclusion of the initial compaction demonstration and at any time during construction, earthwork which does not comply with the specified degree of compaction shall not exceed the previously specified quantities.

e. Periodic compliance tests may be made by the ENGINEER to verify that compaction is meeting the requirements previously specified at no cost to

the CONTRACTOR. The ENGINEER may require retesting of backfill (by CONTRACTOR's Testing Agency) that has settled from water penetration in the trench. CONTRACTOR shall remove the overburden above the level at which the ENGINEER wishes to test and shall backfill and recompact the excavation after the test is complete at no additional cost.

f. If compaction fails to meet the specified requirements, the CONTRACTOR shall remove and replace the backfill at proper density or shall bring the density up to specified level by other means acceptable to the ENGINEER. Subsequent tests required to confirm and verify that the reconstructed backfill has been brought up to specified density shall be paid by the CONTRACTOR. The CONTRACTOR's confirmation tests shall be performed in a manner acceptable to the ENGINEER. Frequency of confirmation tests for remedial work shall be double that amount specified for initial confirmation tests.

2. Field Density Tests

a. Tests shall be performed in sufficient numbers to meet the requirements of Section 01440 and to ensure that the specified density is being obtained.

C. Field density tests shall be made in accordance with ASTM D-1557.

- END OF SECTION -

SECTION 02500

REMOVAL AND REPLACEMENT OF SURFACE IMPROVEMENTS

PART 1 GENERAL

1.01 SUMMARY

A. This section provides for the restoration, removal and replacement of surface improvements as established in this specification, as shown in the Drawings and/or as directed by the ENGINEER.

1.02 RELATED SECTIONS

A. Related work specified in other sections includes but is not limited to:

Section 01440 - Quality Control and Materials Testing
Section 01550 - Job Conditions
Section 02221 - Excavation and Backfill for Buried Pipelines

1.03 REFERENCES

A. The most recent edition of the Utah Public Works General Conditions and Standard Specifications for Construction.

B. The most recent edition of the American Public Works Association (APWA) and Associated General Contractors of America Standard Plans and Standard Specifications.

C. The following are also references applicable to this section.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 1557-	Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb (4.54-kg) Rammer and 18-in. (457-mm) Drop
ASTM D 2487-	Classification of Soils for Engineering Purposes
ASTM D 2922-	Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017-	Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)

1.04 DEFINITIONS

A. Class A Road Repair: This term shall consist of construction of a bituminous surface course, aggregate base and bituminous prime and tack coats as defined in Section 02745 - Hot-Mix Concrete Asphalt Paving.

B. Class B Road Repair: This term shall consist of construction of a gravel road surface as defined in Section 02278, Road Base - Untreated Base Course.

C. Site Drainage: This section pertains to the restoration of storm water naturally draining across or falling on the project site and irrigation water.

1.05 SUBMITTALS

A. Prior to placement of asphalt concrete, the CONTRACTOR shall submit to the ENGINEER for review and acceptance, full details, including design and calculations for the asphalt concrete mix he proposes to use.

B. Laboratory mix design for proposed seal coat application.

C. Quality assurance tests for asphalt and aggregate material sources.

D. Copies of weight and delivery tickets shall be submitted during progress of the work.

E. Untreated Base Course - 3/4" gradation.

1.06 MEASUREMENT AND PAYMENT

A. Removal and Replacement of Surface Improvements shall not be measured or paid as a separate item, but shall be included as part of the various items to which it relates.

PART 2 PRODUCTS

2.01 SOD

A. All damaged sod shall be replaced with sod of equal quality and type as existing or as approved by CLIENT. Replaced sod shall be placed such that no settling or depression results from water infiltration in the new sod.

B. Materials Testing.

2.01 IRRIGATION

A. Any damage to the existing irrigation system in order to access the ponds or perform any work with respect to the project including, but not limited to, sprinklers, pipe, pipe fittings, boxes, culverts, headwalls, ditches and valves; shall be replaced at no cost to CLIENT.

B. Replacement parts to the irrigation system shall be of equal quality or type or as approved by CLIENT.

2.02 CONCRETE WORK

A. Concrete work shall meet the specifications for installation as noted in APWA Section 02770, Concrete Driveway, Sidewalk, Curb and Gutter.

B. All flat work in streets tying into existing flatwork shall be doweled into the existing concrete. Dowels to be spaced at 12" O.C. and be No. 5 x 14" for slabs up to 8 inches in thickness and No. 8 x 18" for slabs over 8 inches.

- END OF SECTION -

SECTION 02895

GEOTEXTILES

PART 1 GENERAL

1.01 REFERENCES

A. ASTM D 276: Standard Test Methods for Identification of Fibers in Textiles.

B. ASTM D 3786: Standard Test Method for Hydraulic Bursting Strength and Knitted Goods and None woven Fabrics – Diaphragm Bursting Strength Tester Method.

C. ASTM D 4354: Standard Test Methods of Sampling of Geotextiles for Testing.

D. ASTM F 4355: Standard Test Methods for Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon – Arc Type Apparatus).

E. ASTM D 4491: Standard Test Methods for the Water Permeability of Geotextiles by Permitivity.

F. ASTM D 4533: Standard Test Methods for Trapezoid Tearing Strength of Geotextiles.

G. ASTM D 4632: Standard Test Method for Breaking Load and Elongation of Geotextiles (Grab Method).

H. ASTM D 4751: Standard Test Method for Determining Apparent Opening Size for a Geotextile.

I. ASTM D 4759: Standard Practice for Determining Specification Conformance of Geosynthetics.

J. ASTM D 4833: Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.

K. ASTM D 4873: Standard Guide for Identification, Storage, and Handling Geotextiles.

1.02 DEFINITIONS

A. Minimum: Use value is weaker principle direction.

B. All numerical values represent minimum average roll values.

C. Stated values are for noncritical, nonsevere, applications.

D. Lots samples according to ASTM D 4354.

1.03 SUBMITTALS

A. Submit prior to using the Work.
   1. Sample of Geotextile.
   2. Manufacture's certificate that each fabric complies with requirement of this section.

1.04 PROJECT CONDITIONS

A. Beginning work means acceptance of existing conditions.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver Geotextile dry, in a wrapping which protects it from the elements during shipping and storage. Keep fabric dry.

1.06 ACCEPTANCE

A. Comply with ASTM D 4759 if product for this section is to be used in the work.

PART 2 PRODUCTS

2.01 GEOTEXTILE – GENERAL

A. Fabric consists of synthetic fibers at least 85 percent by weight of polyolefins, polyester, or polyamides.

B. Resistant to chemical attack, rot and mildew.

C. No tears or defects which will adversely alter fabric's physical properties.

2.02 GEOTEXTILE – SEPARATION FABRIC

A. Separation Fabric: PRO-Pex 4808 or approved equal shall be used to separate subgrade material from existing soils while allowing adequate water penetration as stated below. Fabric should be non-woven geotextile, specifically manufactured for use as a separation, stabilization geotextile; constructed from polypropylene and with the following minimum properties determined according to ASTM D 4759 and referenced standard test methods.

1. Grab tensile strength: 200 lbf; ASTM D 4632;
2. Tear strength: 75 lbf, ASTM D 4533;
3. Puncture Resistance: 110 lbf, ASTM D 4833;
4. Water Flow Rate: 40 gpm per sq.ft.; ASTM D 4491;
5. Apparent Opening Size: No. 40; ASTM D 4751;

PART 3 EXECUTION

3.01 PROTECTION AN REPAIR

A. Protection and Repair:

1. Do not allow any construction equipment to drive on the fabric.

2. Remove and replace damage geotextile with the same type of geotextile, and shingle-lap in the direction of paving. Restrict overlaps to maximum of 6 inches.

- END OF SECTION -

SECTION 03100

CONCRETE FORMWORK

PART 1 - GENERAL

1.01 SCOPE

This section specifies the work necessary to furnish, place, and remove all formwork for cast-in-place concrete.

1.02 SUBMITTALS

Submittal procedures are specified in Section 01300, SUBMITTALS.

The Contractor shall submit mill affidavits stating the grade and physical properties of form materials before the materials are delivered to the site. The affidavits shall demonstrate that the materials and procedures comply with the specifications of this section.

1.03 REGULATORY REQUIREMENTS

The Contractor shall comply fully with the requirements of the International Building Code 2003 Chapter 19, "Concrete", 2003 edition, regarding the design of concrete forms, falsework and shoring, and the inspection of same prior to placement of concrete. Where the IBC 2003 requires the services of a civil engineer registered in the State of Utah to approve design calculations and working drawings of the falsework or shoring system, or to inspect such system prior to placement of concrete, the Contractor shall employ a registered civil engineer for these purposes, and all costs therefore shall be included in the price named in the Contract for completion of the work as set forth in the Contract Documents.

Except as modified by the requirements specified herein and/or the details on the drawings, concrete formwork shall conform to the IBC.

PART 2 - PRODUCTS

2.01 MATERIALS

A. **Forms for Exposed Finish Concrete**

Unless otherwise indicated, construct formwork for exposed concrete surfaces with plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings. Provide form material with sufficient thickness to withstand pressure of newly-placed concrete without bow or deflection.

Use plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood", Class I, Exterior Grade or better, mill-oiled and edge-sealed, with each piece bearing legible inspection trademark.

B. **Forms for Unexposed Finish Concrete**

Form concrete surfaces which will be unexposed in finished structure with plywood, lumber, metal, or other acceptable material as determined by the Construction Manager. Provide lumber dressed on at least 2 edges and one side for tight fit.

C. **Form Ties**

Provide factory-fabricated, adjustable-length, removable or snap-off metal form ties, designed to prevent deflection, and to prevent spalling concrete surfaces upon removal.

Unless otherwise shown, provide ties so that portion remaining within concrete after removal of exterior parts is at least 1 1/2 inch from the outer concrete surface. Unless otherwise indicated, provide form ties which will leave a hole 1 inch diameter in the concrete surface.

D. **Form Coatings**

Provide commercial formulation form coating compounds that will not bond with, stain, nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.

PART 3 - EXECUTION

3.01 INSTALLATION OF FORMS

A. **General**

Design, erect, support, brace and maintain formwork to support vertical and lateral loads that might be applied until such loads can be supported by concrete structure. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position.

Design formwork to be readily removable without impact, shock, or damage to cast-in-place concrete surfaces and adjacent materials.

Construct forms in compliance with ACI 347, to sizes, shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.

Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and for easy removal.

Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.

Chamfer all exposed corners and edges with 3/4 inch chamfers unless otherwise noted on the drawings, using wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints. Fillets are not required unless otherwise noted on the drawings.

B. **Exposed Surface Form Tolerances**

Forms for exposed concrete surfaces shall be designed and constructed so that the formed surface of the concrete does not undulate excessively in any direction between studs, joists, form stiffeners, form fasteners, or wales. Undulations exceeding either 3/32 in. or 1/270 of the center to center distance between studs, joists, form stiffeners, form fasteners or wales will be considered to be excessive. Should any form or forming system, even

though previously approved for use, produce a concrete surface with excessive undulations, its use shall be discontinued until modifications satisfactory to the Engineer have been made. Portions of concrete structures with surface undulations in excess of the limits herein may be rejected by the Engineer.

C. **Form Ties**

Install factory-fabricated, adjustable-length, removable or snapoff metal form ties, designed and spaced to prevent form deflection, and to prevent spalling concrete surfaces upon removal.

D. **Provisions for Other Trades**

Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses and chases from trades providing such items. Accurately place and securely support items built into forms.

E. **Cleaning and Tightening**

Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before concrete is placed. Retighten forms and bracing after concrete placement if required to eliminate mortar leaks and maintain proper alignment.

3.02 PREPARATION OF FORM SURFACES

Coat contact surfaces of forms with a form-coating compound before reinforcement is placed.

Thin form-coating compounds only with thinning agent of type, and in amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.

Coat steel forms with a non-staining, rust-preventative form oil or otherwise protect against rusting. Rust-stained steel formwork is not acceptable.

3.03 REMOVAL OF FORMS

Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50°F for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.

Formwork supporting weight of concrete, such as beam soffits, joints, slabs and other structural elements, may not be removed in less than 14 days and until the concrete has attained design minimum compressive strength at 28 days. Determine potential compressive strength of inplace concrete by testing field-cured specimens representative of concrete location or members.

Form facing material may be removed 4 days after placement, only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.

3.04 RE-USE OF FORMS

Clean and repair surfaces of forms to be re-used in work. Split, frayed, delaminated, or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.

When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces.

END OF SECTION

SECTION 03200

CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.01 SCOPE

This section covers the furnishing and installing of reinforcing steel for cast-in-place concrete work as shown and noted on the drawings and as specified.

1.02 REFERENCES

The editions of the specifications and standards referenced herein, published by the following organizations, apply to the work only to the extent specified by the reference. The latest version in effect at the time of bid shall apply.

American Concrete Institute (ACI)
American Society for Testing and Materials (ASTM)
Concrete Reinforcing Steel Institute (CRSI)
American Welding Society (AWS)

1.03 SUBMITTALS

Submittal procedures and quantities are specified in Section 01300, SUBMITTALS.

Submit shop and placement drawings of all reinforcing for review.

Placement drawings shall show the locations and spacing of reinforcing in the various parts of the structure with details as required, all in accordance with ACI. Cutting and bending lists submitted without placement drawings will be returned without review as incomplete. Placement drawings shall not be reproduced marked up copies of the design drawings. Placement drawings shall be complete so that placement of the reinforcing may proceed without reference to the design drawings.

Review shall not act to relieve the Contractor from responsibility for accuracy of the fabrication details and placing diagrams. Dimensions and locations shall be verified prior to the preparation of shop drawings.

No work shall be done except from reviewed drawings which must be kept at all work locations.

Mill affidavits, stating the grades and physical and chemical properties of the reinforcing steel, and conformance with ASTM specifications, shall be submitted before delivery of the steel to the job site.
At the completion of the work, one complete set of placement bending diagrams shall be delivered to the Engineer for hard purposes.

1.04 REGULATORY REQUIREMENTS

Except as modified by the requirements specified herein and/or the details on the drawings, concrete reinforcing work shall conform to the *International Building Code* (IBC), Chapter 19, "Concrete", 2003 Edition and the requirements of the CRSE Manual of Standard Practice.

1.05 DELIVERY AND STORAGE

Deliver reinforcement bundled and tagged to identify placement and certify testing.

Reinforcing steel shall be transported to the building site, stored and covered in a manner which will insure that no damage shall occur to it from moisture, dirt, grease, or any other cause that might impair bond to concrete. A sufficient supply of approved reinforcing steel shall be stored on the site at all times to insure that there will be no delay of the work. Identification of steel shall be maintained after bundles are broken.

1.06 COORDINATION

Contractor shall check architectural, structural, civil, mechanical, and electrical drawings for anchor bolt schedules and locations, anchors, inserts, conduits, sleeves, and any other items which are required to be cast in concrete, and shall make necessary provisions as required so that reinforcing steel will not interfere with the placement of such embedded items.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Reinforcing Bars

New, deformed, billet steel bars, conforming to ASTM A615-84a. Deliver bars new and free from rust and mill scale in original bundles with mill tags intact. Grade 40 for No. 3 bars and smaller, Grade 60 for No. 4 bars and larger.

Reinforcement resisting earthquake-induced flexural and axial forces in frame members and in wall boundary members shall comply with low alloy ASTM A706. ASTM A615

Grade 60 reinforcement may be used in these members if the following requirements are met:

a. The actual yield strength based on mill tests does not exceed the specified yield strength by more than 18,000 pounds per square inch (retests shall not exceed this value by more than an additional 3,000 pounds per square inch).

b. The ratio of the actual ultimate tensile stress to the actual tensile yield strength is not less than 1.25.

Reinforcing bars to be welded shall be weldable steel ASTM A706, Grade 40 for No. 3, Grade 60 for No. 4 bars and larger.

B. **Welded Wire Fabric**

New welded steel wire fabric, conforming to ASTM A185. Gage and center-to-center spacing shall be as indicated.

C. **Accessories**

Reinforcement accessories, consisting of spacers, ties, and similar items shall be provided as required for spacing, assembling, and supporting reinforcement in place. Accessories shall be reinforcing steel or precast concrete blocks conforming to the applicable requirements of the CRSI *Manual of Standard Practice*.

D. **Tie Wire**

Tie wire for reinforcement shall be No. 16 gage or heavier, where noted or specified, black or galvanized steel wire, conforming to ASTM A82-79.

E. **Welding Electrodes**

AWS A5.1-81, grade E70XX for welding grade 40 reinforcing steel and E90XX for welding grade 60.

PART 3 - EXECUTION

3.01 FABRICATION

Fabrication of steel reinforcement shall be in accordance with the details shown on the drawings. Where specific details are not shown or noted, comply with the applicable requirements of IBC and ACI 318.

Bars shall be accurately bent, cut and placed as indicated on the drawings. Bars shall be bent cold; heating of bars will not be permitted. Bars shall not be bent or straightened in any manner that will injure the material. All reinforcing bars shall be bent in an approved fabricating shop. Field bending of reinforcement shall not be permitted.

3.02 PLACING

A. General

Reinforcing steel shall be placed in accordance with the drawings and the applicable requirements of the latest edition of the CRSI *Manual of Standard Practice* and the *International Building Code* (IBC), Chapter 19, "Concrete", 2003 Edition.
Install reinforcement accurately and secure against movement, particularly under the weight of workmen and the placement of concrete.

B. Reinforcing Supports

Bars and welded wire fabric layers shall be supported on precast concrete blocks wire tied to reinforcement and accurately placed. Spacing of blocks and accessories shall conform with CRSI's *Recommended Practice for Placing Bar Supports*. No wood will be permitted inside forms. Precast concrete blocks shall be used to support footing and slab reinforcing on ground and slab and beam reinforcement on horizontal form work.

C. Placing and Tying

All reinforcing shall be set in place, spaced, and rigidly and securely tied or wired with No. 16 gage steel tie wire at all splices and at crossing points and intersections in the position shown, or as directed by the Engineer. Point ends of wire away from forms.

D. Spacing

Bars shall be spaced as indicated on the drawings. Where not shown, the clear spacing for main longitudinal reinforcement shall be not less than 1.5 times the nominal bar diameter, or 1 1/2 in., or 1 1/3 times the maximum size aggregate, whichever is greater. For all other parallel bars, where spacing is not shown, the minimum clear spacing shall not be less than the nominal bar diameter, or 1 in., or 1 1/3 times the maximum size aggregate, whichever is less. The clear distance limitations above also apply between the bars being spliced at a contact lap splice and adjacent bars.

E. Splices

Except for temperature bars in slabs and horizontal wall reinforcing, no splicing will be allowed for reinforcing bars unless detailed locations are given for these splices on the design drawings, or approval is given. Stagger lapped splices for horizontal wall

reinforcing and slab temperature bars by the required lap splice length minimum. Wherever possible, splices of adjacent bars shall be staggered.

Reinforcing bars may be continuous at locations where splices are shown on the plans, at the option of the Contractor. The location of splices, except where shown on the plans, shall be determined by the Contractor based upon using available commercial lengths where practicable.

F. **Welded Wire Fabric**

Wire fabric shall be in as long lengths as practicable and shall be wired at all laps and splices. Laps shall be one full spacing of the cross wires plus 2 in. at splices. Welded wire fabric shall be supplied in flat sheets.

G. **Dowels**

Dowels shall be tied securely in place before concrete is deposited. In the event there are no bars in position to which dowels may be tied, No. 3 bars shall be added to provide proper support and anchorage. Bending of dowels after placement of concrete will not be permitted unless approval is obtained. Dowels extended for future construction shall be protected from weather as shown on drawings. Compliance with safety law requirements for extended dowels is required.

H. **Cleaning**

Reinforcement, at time of pour, shall be free of mortar, oil, dirt, excessive mill scale, scabby rust and other coatings that would impair bond to concrete.

I. **Welding**

Welding of reinforcing steel shall comply with UBC Standard 26-8 or AWS D1.4-79. Do not weld reinforcing steel until a chemical analysis sufficient to determine the carbon equivalent of the steel has been performed. This analysis shall be made from the chemical composition shown in the mill test reports or by chemical analysis of bars representative of the bars to be welded. The carbon equivalent shall not exceed 0.55 as calculated in accordance with UBC 26-4, Section 26.407. Preheating of Grade 60 bars will be required immediately prior to welding.

3.03 TESTING AND INSPECTION

Contractor shall provide notification at least 2 working days ahead of each concrete pour, and no concrete shall be placed until all reinforcing steel has been installed by the Contractor and approved by the Engineer. All reinforcing shall be complete in every way by the end of the working day prior to concrete placing.

3.04 SPECIAL INSPECTION

Special inspection is required as defined in UBC Section 306.

3.05 DEFECTIVE WORK

The following reinforcing steel work will be considered defective and shall be removed and replaced by the Contractor at no additional cost to the Owner.

- Bars with kinks or bends not shown on drawings.
- Bars injured due to bending or straightening.
- Bars heated for bending.
- Reinforcement not placed in accordance with the drawings or specifications.

END OF SECTION

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SUMMARY

A. This section covers cast-in-place concrete.

1.02 RELATED WORK

A. Related work specified in other sections includes but is not limited to:

Section 02222 - Excavation and Backfill for Structures
Section 03100 - Concrete Formwork
Section 03200 - Concrete Reinforcement

1.03 MEASUREMENT AND PAYMENT

A. Cast-in-place concrete shall not be measured or paid as a separate item, but shall be included as part of the various items to which it relates.

1.04 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

B. AMERICAN CONCRETE INSTITUTE (ACI)

1. 117 Standard Tolerances for Concrete Construction and Materials
2. 211 Selecting Proportions for Normal, Heavyweight, and Mass Concrete
3. 301 Structural Concrete for Buildings
4. 305R Hot Weather Concreting
5. 306R Cold Weather Concreting
6. 318 Building Code Requirements for Reinforced Concrete
7. 350R Environmental Engineering Concrete Structures

C. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

1. C 31 Making and Curing Concrete Test Specimens in the Field
2. C 33 (1990) Concrete Aggregates

3. C 39 Compressive Strength of Cylindrical Concrete Specimens
4. C 42 Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
5. C 78 Flexural Strength of Concrete (Using Simple Beam With Third-Point Loading)
6. C 94 Ready-Mixed Concrete
7. C 109 Compressive Strength of Hydraulic Cement Mortars(Using 2-in. or 50-mm Cube Specimens)
8. C 143 Slump of Hydraulic Cement Concrete
9. C 150 Portland Cement
10. C 171 Sheet Materials for Curing Concrete
11. C 172 Sampling Freshly Mixed Concrete
12. C 173 Air Content of Freshly Mixed Concrete by the Volumetric Method
13. C 192 Making and Curing Concrete Test Specimens in the Laboratory
14. C 231 Air Content of Freshly Mixed Concrete by the Pressure Method
15. C 260 Specification for Air-Entraining Admixtures for Concrete
16. C 309 Liquid Membrane-Forming Compounds for Curing Concrete
17. C 494 Chemical Admixtures for Concrete
18. C 618 Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete
19. C 1107 Packaged Dry, Hydraulic-Cement Grout (Nonshrinkable)

1.05 DEFINITIONS

A. Average Strength (f_{cr}): The required average strength for 30 consecutive strength tests which statistically assures not more than the permissible proportions of tests will fall below Specified Strength.

B. Specified Strength (f_c'): The indicated strength.

1.06 SUBMITTALS

A. The following shall be submitted in accordance with Section 01300 - Contractor Submittals.

B. The results of trial mix designs along with a statement giving the maximum nominal coarse aggregate size and the proportions of all ingredients that will be used in the manufacture of each strength of concrete, at least 14 days prior to commencing concrete placing operations. Aggregate weights shall be based on the saturated surface dry condition. The statement shall be accompanied by test results from an independent commercial testing laboratory, attesting that the proportions selected will produce concrete of the qualities indicated. No substitutions shall be made in the materials used in the work without additional tests to show that the quality of the

concrete is satisfactory. Indicate whether mixes have been designed for pumping. Include in the report the following information:

1. Water-cement ratio.

2. Proportion of materials in the mix.

3. Source and type of cement.

4. Analysis of water to be used unless potable.

5. Type and name of admixtures applied. Indicate when accelerating or retarding admixtures are to be used and the resulting change in placement times.

6. Slump, air content and temperature of samples.

7. Unit weight of fresh and dry light weight concrete.

C. Pre-approved Mix Design Data: If supplier has on record, an OWNER approved mix design, submit name and address of supplier for each mix design 1 day prior to using concrete mix.

D. Certified copies of laboratory test reports, including all test data, for aggregate, admixtures, and curing compound. These tests shall be made by an approved commercial laboratory or by a laboratory maintained by the manufacturers of the materials.

E. Cementitious Materials showing Manufacturer's certification of compliance, accompanied by mill test reports attesting that the materials meet the requirements of the specification under which it is furnished, for cement and pozzolan.

1.07 QUALITY ASSURANCE

A. Do not change material sources, type of cement, air-entraining agent, water reducing agent, other admixtures, or aggregate without ENGINEER'S approval.

B. In proportioning materials for mixing, use scales certified by the State of Utah. Do not use volume measurement except for water and liquid admixtures.

C. Do not change the quantity of cement per cubic yard for approved mix design without written approval of ENGINEER.

D. Use of admixtures will not relax hot or cold weather placement requirements.

E. Ready-mixed concrete to be in accordance with Alternate No. 3 of ASTM C-94 and requirements in this Section.

F. Tolerances for concrete construction and materials shall be in accordance with ACI117.

1.08 PRODUCT STORAGE AND HANDLING

A. Store bagged and bulk cement in weatherproof enclosures to exclude moisture and contaminants.

B. Stockpile aggregate to avoid segregation and prevent contamination.

C. Avoid contamination, evaporation, or damage to admixtures. Protect liquid admixtures from freezing.

PART 2 PRODUCTS

2.01 ADMIXTURES

A. Air Entrainment: ASTM C 260.

B. Water Reducing and Set Retarding Agents: ASTM C494.

1. Type A: Set water reducing.
2. Type B: Set retarding.
3. Type C: Set accelerating.
4. Type D: Water reducing and set retarding.
5. Type E: Water reducing and set accelerating.
6. Type F: High range water reducing (super plasticizer).*
7. Type G: High range water reducing and set retarding.*

* The relative durability factor of water reducing admixtures shall not be less than 80 and the chlorides content (as C1-) expressed as a percent of the cement shall not exceed .1 percent by weight.

C. Calcium Chloride: None allowed.

D. Pozzolan: Pozzolan conforming to the requirements of ASTM C 618, Class F, is allowed as a Portland cement replacing agent under the following conditions:

1. The maximum percentage of Portland cement replacement is:
   a. 15 percent, for concrete exposed to weather.
   b. 20 percent, for interior concrete.

2. Pozzolan should not exceed 25% by weight of the cement plus Pozzolans.

3. The minimum cement content shall be used in the design formulas before replacement is made.

4. Loss of ignition of pozzolan is less than 3 percent and the water requirement does not exceed 100 percent.

5. All other requirements of this section still apply.

6. Mix designs including trial batches are required for each aggregate source and for each concrete class.

2.02 CEMENTITIOUS MATERIALS

A. Cementitious materials shall each be of one type and from one source when used in concrete which will have surfaces exposed in the finished structure. Cementitious materials shall conform to one of the following:

1. Cement: Use Portland cement, ASTM C 150, Type II, Type IIA, or Type V, low alkali, unless noted otherwise.

B. Only one brand of cement from one manufacturing plant may be used.

2.03 AGGREGATES

A. Aggregates shall be natural aggregates, free from deleterious coatings, and shall conform to the requirements of ASTM C 33, except as modified herein. Aggregates shall not be potentially reactive as defined in Appendix XI of ASTM C 33. The CONTRACTOR shall import nonreactive aggregates if local aggregates are reactive.

B. Fine Aggregates

1. Fine aggregate shall consist of clean, sharp, natural sand and shall conform to the requirements of ASTM C 33. Fine aggregate shall be graded as follows:

SIEVE SIZE	PERCENT PASSING BY WEIGHT
3/8 inch	100
#4	95-100
#8	80-100
#16	50-85
#30	25-60
#50	10-30
#100	2-10

2. Fine aggregates shall have no more than two percent by weight passing #200 sieve.

C. Coarse Aggregate

1. Coarse aggregate shall be washed gravel or crushed stone, or a combination of these materials, consisting of hard, tough, durable particles free from adherent coatings. It shall contain no more than 15 percent flat or elongated particles. A thin, flat or elongated particle is defined as a particle having a maximum dimension in excess of five times its minimum dimension. Aggregate which has disintegrated or weathered badly under exposure conditions similar to those which will be encountered in the work under consideration shall be not be used. Coarse aggregate shall be graded as follows (ASTM C 33):

SIEVE SIZE	PERCENT PASSING BY WEIGHT
1 inch	100
3/4 inch	95-100
1/2 inch	25-60

#4	0-10
#8	0-5

2. Coarse aggregates shall have no more than 1.75 percent by weight passing #200 sieve. Proof of gradation will be provided to ENGINEER by the CONTRACTOR.

2.04 ACI MIX DESIGN

A. The amount by which the average strength (f_{cr}) of a concrete mix exceeds the specified compressive strength (f'_c) shall be based upon no more than 1 in 100 random individual strength tests falling more than 500 psi below the specific strength.

B. Proportion the materials in accordance with ACI 211.1, 211.2 or 211.3 as applicable to produce concrete having the properties or limitations of Table No. 03300-A.

2.05 HAND MIXING

A. Do not hand mix batches exceeding 0.5 cubic yards.

B. Hand mix only on watertight platform. Mix cement and aggregate prior to adding water.

C. Ensure all stones are thoroughly covered with mortar and mixture is of uniform color and consistency.

2.06 HEATING, WATER AND AGGREGATE

A. Do not allow products of fuel combustion to contact the aggregate.

B. Heat mixing water 150 degrees F. maximum. Heat aggregates uniformly.

C. Do not mix cement with water and aggregate at a mix temperature greater than 100 degrees F.

2.07 WATER

A. Water shall be potable, except that nonpotable water may be used if it produces mortar cubes having 7- and 28-day strengths at least 90 percent of the strength of similar specimens made with water from a municipal supply. The strength

comparison shall be made on mortars, identical except for mixing water, prepared and tested in accordance with ASTM C 109. Water for curing shall not contain any substance injurious to concrete, or which causes staining.

2.08 PROPORTIONS OF MIX

A. Mixture Proportioning, Normal Weight Concrete: All concrete that must be watertight and resistant to freeze-thaw cycles and to naturally occurring or commonly used chemicals should be air entrained. All materials should be proportioned to produce a well-graded mixture of high density and maximum workability with a minimum specified 28 day compressive strength of **5000 psi**. Trial batches shall contain materials proposed to be used in the project. Trial mixtures having proportions, consistencies and air content suitable for the work shall be made based on methodology described in ACI 211.1, using at least three different water-cement ratios. Trial mixes shall be proportioned to produce concrete strengths specified. In the case where ground iron blast-furnace slag is used, the weight of the slag will be substituted in the equations for the term P which is used to denote the weight of pozzolan. Trial mixtures shall be designed for maximum permitted slump and air content. The temperature of concrete in each trial batch shall be reported. For each water-cement ratio at least three test cylinders for each test age shall be made and cured in accordance with ASTM C 192. They shall be tested at 7 and 28 days in accordance with ASTM C 39. From these test results a curve shall be plotted showing the relationship between water-cement ratio and strength. Maximum water-cement or water-cement plus Pozzolan Ratio: 0.45.

B. Average Strength: In meeting the strength requirements specified, the selected mixture proportion shall produce an average compressive strength exceeding the specified strength by the amount indicated below. Where a concrete production facility has test records, a standard deviation shall be established. Test records from which a standard deviation is calculated shall represent materials, quality control procedures, and conditions similar to those expected; shall represent concrete produced to meet a specified strength or strengths within 1000 psi of that specified for proposed work; and shall consist of at least 30 consecutive tests. A strength test shall be the average of the strengths of two cylinders made from the same sample of concrete and tested at 28 days or at other test age designated for determination of the specified strength.

2.09 CONCRETE PROPERTIES

A. Exterior Cast-in-Place Concrete Structures: Class 5000 minimum in accordance with the following table and ACI 318, unless a different strength of concrete is indicated.

TABLE NO. 03300-A

CONCRETE MIX PROPERTIES (e)				
CONCRETE PROPERTIES	CONCRETE CLASSIFICATION(S)			
	Class 5000	Class 4000	Class 3500	Class 3000
Specified Compressive Strength $f_{c'}$ at 28 days, min., psi	5000	4000	3500 (d)	3000 (d)
Compressive Strength at 7 days, min., psi (a)	3550	2680	2345	2010
Cement content (94 lb. sacks of cement per cubic yard of concrete), min. (b)	7.0	6.0	5.75	5.5
Entrained air content, (% by volume).	6±1	6±1	6±1	6±1
Slump Range, in. (c)	1-4	1 - 4 (f)	2 - 4	2 - 4

(a) Used for monitoring purposes only.
(b) May include pozzolan replacements if approved by ENGINEER.
(c) Not more than 8 inches after adding high range water reducing admixture (super-plasticizer) at site.
(d) Not allowed if concrete is exposed to freezing and thawing temperatures. Use Class 4000 or higher compressive strength and 6±1.0 percent air entrainment.
(e) All mix designs must be approved by ENGINEER.
(f) 1-3" for footings, substructural walls and 1-4" for slabs, beams, reinforced walls and columns.

PART 3 EXECUTION

3.01 PREPARATION OF SURFACES

A. Surfaces to receive concrete shall be clean and free from frost, ice, snow, mud, and water. Conduit and other similar items shall be in place and clean of any deleterious substance.

B. Foundations: Earthwork shall be as specified. Flowing water shall be diverted without washing over freshly deposited concrete. Rock foundations shall be cleaned by high velocity air-water jets, sandblasting, or other approved methods. Debris and loose, semi-detached or unsound fragments shall be removed. Rock surfaces shall be moist but without free water when concrete is placed. Semiporous subgrades for foundations and footings shall be damp when concrete is placed. Pervious subgrades shall be sealed by blending impervious material with the top 6 inches of the in-place pervious material or by covering with an impervious membrane.

C. Preparation of Previously Placed Concrete: Concrete surfaces to which other concrete is to be bonded shall be roughened in an approved manner that will expose sound aggregate uniformly without damaging the concrete. Laitance and loose particles shall be removed. Surfaces shall be moist but without free water when concrete is placed.

3.02 INSTALLATION OF EMBEDDED ITEMS

A. Embedded items shall be free from oil, loose scale or rust, and paint. Embedded items shall be installed at the locations indicated and required to serve the intended purpose. Voids in sleeves, slots and inserts shall be filled with readily removable material to prevent the entry of concrete.

3.03 BATCHING, MIXING AND TRANSPORTING CONCRETE

A. Ready-mixed concrete shall be batched, mixed and transported in accordance with ASTM C 94, except as otherwise specified. Truck mixers, agitators, and nonagitating units shall comply with NRMCA TMMB-1. Ready-mix plant equipment and facilities shall be certified in accordance with NRMCA-QC 3.

B. The use of non-agitating equipment for transporting ready-mixed concrete will not be permitted. Combination truck and trailer equipment for transporting ready-mixed concrete will not be permitted. The quantity and quality of materials used in ready-mixed concrete and in batch aggregates shall be subject to continuous inspection at the batching plant by the ENGINEER.

C. Truck mixers and their operation must be such that the concrete throughout the mixed batch as discharged is within acceptable limits of uniformity with respect to consistency, mix, and grading. If slump tests taken at approximately the 1/4 and 3/4 points of the load during discharge give slumps differing by more than 1 inch when the specified slump is 3 inches or less, or more than 2 inches when the specified slump is more than 3 inches, the mixer shall not be used on the work unless the causing condition is corrected and satisfactory performance is verified by additional slump tests. All mechanical details of the mixer, such as water measuring and discharge apparatus, condition of the blades, speed of rotation, general mechanical condition of the unit, and clearance of the drum, shall be checked before a further attempt to used the unit will be permitted.

D. Admixtures: Admixtures shall be batched within an accuracy of 3 percent. Where two or more admixtures are used in the same batch, they shall be batched separately and must be compatible. Retarding admixture shall be added within one minute after addition of water is complete or in the first quarter of the required mixing time, whichever is first. Superplasticizing admixtures shall be added at the project site, and the concrete with the admixture shall be mixed 4 to 5 minutes before placing as recommended by manufacturer. Concrete that shows evidence of total collapse or segregation caused by the use of admixture shall be removed from the site.

E. Control of Mixing Water: No water from the truck system or elsewhere shall be added after the initial introduction of mixing water for the batch. No water shall be added at the jobsite without the approval of the ENGINEER.

3.04 SAMPLING AND TESTING

A. Sampling and Testing of the concrete will be by the OWNER or his representatives. The CONTRACTOR shall assist the OWNER's representative at the site with concrete testing.

1. Aggregates: Aggregates for normal weight concrete shall be sampled and tested in accordance with ASTM C 33.

2. Sampling of Concrete: Samples of concrete for air, slump, unit weight, and strength tests shall be taken in accordance with ASTM C 172.
   a. Air Content: Test for air content shall be performed in accordance with ASTM C 173 or ASTM C 231. A minimum of 1 test shall be conducted each time a slump test is made.
   b. Slump: At least 1 slump test shall be made on randomly selected batches of each mixture of concrete for every 50 cubic yards of ready-mixed concrete delivered to the job site. Also note the time batched at the plant and the starting time when unloading began at the site. Tests shall be performed in accordance with ASTM C 143.
   c. Temperature: Concrete and air temperatures shall be measured and recorded with each set of cylinders and the air temperature shall also be recorded when the air temperature at the site is 40 degrees F or below and/or 90 degrees F or above.

3. Evaluation and Acceptance of Concrete
   a. Frequency of Testing: Samples for strength tests of each class of concrete placed each day shall be taken not less than once a day, nor less than once for each 50 cubic yards of concrete, nor less than once for each 3000 square feet of surface area for slabs or walls. If this sampling frequency results in less than 5 strength tests for a given class of concrete, tests shall be made from at least 5 randomly selected trucks or from each truck if fewer than 5 truck loads are used. Field cured specimens for determining form removal time or when a structure may be put in service shall be made in numbers directed to check the adequacy of curing and protection of concrete in the structure. The specimens shall be removed from the molds at the age of 24 hours and shall be cured and protected, insofar as practicable, in the same manner as that given to the portion of the structure the samples represent.
   b. Testing Procedures: Cylinders for acceptance tests shall be molded and cured in accordance with ASTM C 31. Cylinders shall be tested in accordance with ASTM C 39. A strength test shall be the average

of the strengths of two cylinders made from the same sample of concrete and tested at 28 days or at another specified test age.

c. Evaluation of Results: Concrete specified on the basis of compressive strength will be considered satisfactory if the averages of all sets of three consecutive strength test results equal or exceed the specified strength and no individual strength test result falls below the required strength by more than 500 pounds per square inch.

d. Unless noted otherwise, make a minimum of four (4) concrete cylinders each time a test is required. When concrete is being placed in suspended slabs, beams and retaining walls make two (2) extra cylinders which must be cured on site. The extra cylinders will be used to determine when to remove forms and/or when to backfill.

B. Investigation of Low-Strength Test Results: When any strength test of standard-cured test cylinder falls below the specified strength requirement by more than 500 pounds per square inch, or if tests of field-cured cylinders indicate deficiencies in protection and curing, steps shall be taken to assure that load-carrying capacity of the structure is not jeopardized. Nondestructive testing in accordance with ASTM C 597, ASTM C 803 or ASTM C 805 may be permitted by the ENGINEER to determine the relative strengths at various locations in the structure as an aid in evaluating concrete strength in place or for selecting areas to be cored. Such tests, unless properly calibrated and correlated with other test data, shall not be used as a basis for acceptance or rejection. When strength of concrete in place is considered potentially deficient, cores shall be obtained and tested in accordance with ASTM C 42. At least three representative cores shall be taken from each member or area of concrete in place that is considered potentially deficient. The location of cores shall be determined by the ENGINEER to least impair the strength of the structure. If the concrete in the structure will be dry under service conditions, the cores shall be air dried (temperature 60 to 80 degrees F, relative humidity less than 60 percent) for seven days before testing and shall be tested dry. If the concrete in the structure will be more than superficially wet under service conditions, the cores shall be tested after moisture conditioning in accordance with ASTM C 42. Concrete in the area represented by the core testing will be considered adequate if the average strength of the cores is equal to or at least 85 percent of the specified strength requirement and if no single core is less than 75 percent of the specified strength requirement. If the core tests are inconclusive or impractical to obtain, or if structural analysis does not confirm the safety of the structure, load tests may be directed by the ENGINEER in accordance with the requirements of ACI 318. Concrete work evaluated by structural analysis or by results of a load test and found deficient shall be corrected in a manner satisfactory to the ENGINEER. All investigations, testing, load tests, and correction of deficiencies shall be performed, and approved by the ENGINEER, at the expense of the CONTRACTOR.

3.05 CONVEYING CONCRETE

A. Concrete shall be conveyed from mixer to forms as rapidly as possible and within the time interval specified in paragraph CONCRETE PLACEMENT by methods which will prevent segregation or loss of ingredients.

1. Chutes: When concrete can be placed directly from a truck mixer or other transporting equipment, chutes attached to this equipment may be used. Separate chutes will not be permitted except when specifically approved.

2. Buckets: Bucket design shall be such that concrete of the required slump can be readily discharged. Bucket gates shall be essentially grout tight when closed. The bucket shall provide means for positive regulations of the amount and rate of deposit of concrete in each dumping position.

3. Belt Conveyors: Belt conveyors may be used when approved. Belt conveyors shall be designed for conveying concrete and shall be operated to assure a uniform flow of concrete to the final place of deposit without segregation or loss of mortar. Conveyors shall be provided with positive means for preventing segregation of the concrete at transfer points and point of placement.

4. Pumps: Concrete may be conveyed by positive displacement pumps when approved. Pump shall be the piston or squeeze pressure type. Pipeline shall be steel pipe or heavy duty flexible hose. Inside diameter of the pipe shall be at least three times the maximum size of the coarse aggregate. Distance to be pumped shall not exceed the limits recommended by the pump manufacturer. Concrete shall be supplied to the pump continuously. When pumping is completed, the concrete remaining in the pipeline shall be ejected without contaminating the concrete in place. After each use, the equipment shall be thoroughly cleaned. Flushing water shall be wasted outside the forms.

3.06 CONCRETE PLACEMENT

A. Mixed concrete which is transported in truck mixers or agitators or concrete which is truck mixed, shall be discharged within 1-1/2 hours or before the drum has revolved 300 revolutions, whichever comes first after the introduction of the mixing water to the cement and aggregates or the introduction of the cement to the aggregates. These limitations may be waived by the ENGINEER if the concrete is of such slump after the 1-1/2 hour time or 300 revolution limit has been reached that it can be placed, without the addition of water to the batch. When the concrete temperature exceeds

85 degrees F, the time shall be reduced to 45 minutes. Concrete shall be placed within 15 minutes after it has been discharged from the truck.

1. Placing Operation: Concrete shall be handled from mixer to forms in a continuous manner until the approved unit of operation is completed. Adequate scaffolding, ramps and walkways shall be provided so that personnel and equipment are not supported by in-place reinforcement. Placing will not be permitted when the sun, heat, wind, or limitations of facilities furnished by the CONTRACTOR prevent proper consolidation, finishing and curing. Concrete shall be deposited as close as possible to its final position in the forms, and there shall be no vertical drop greater than 4 feet except where suitable equipment is provided to prevent segregation and where specifically authorized. Concrete should not be allowed to drop through a cage of reinforcing steel. Depositing of the concrete shall be so regulated that it will be effectively consolidated in horizontal layers not more than 12 inches thick, except that all slabs shall be placed in a single layer. Concrete to receive other construction shall be screened to the proper level to avoid excessive shimming or grouting.

2. Consolidation: Immediately after placing, each layer of concrete shall be consolidated by internal vibrators, except for slabs 4 inches or less. The vibrators shall at all times be adequate in effectiveness and number to properly consolidate the concrete; a spare vibrator shall be kept at the jobsite during all concrete placing operations. The vibrators shall have a frequency of not less than 8000 vibrations per minute, and the head diameter and amplitude shall be appropriate for the concrete mixture being placed. Vibrators shall be inserted vertically at uniform spacing over the area of placement. The distance between insertions shall be approximately 1-1/2 times the radius of action of the vibrator so that the area being vibrated will overlap the adjacent just-vibrated area by a few inches. The vibrator shall penetrate rapidly to the bottom of the layer and at least 6 inches into the preceding layer if there is such. Vibrator shall be held stationary until the concrete is consolidated and then withdrawn slowly. The use of form vibrators must be specifically approved. Vibrators shall not be used to transport concrete within the forms. Slabs 4 inches and less in thickness shall be consolidated by properly designed vibrating screeds or other approved technique.

B. Cold Weather Requirements: Special protection measures, approved by the ENGINEER, shall be used if freezing temperatures are anticipated before the

expiration of the specified curing period. Provisions should be made to keep the concrete at a minimum temperature of 50 degrees F for 3 days. The ambient temperature of the air where concrete is to be placed and the temperature of surfaces to receive concrete shall be not less than 40 degrees F. No concrete shall be placed on frozen ground. The temperature of the concrete when placed shall be not less than 55 degrees F nor more than 75 degrees F. Heating of the mixing water or aggregates will be required to regulate the concrete placing temperature. Materials entering the mixer shall be free from ice, snow, or frozen lumps. Salt, chemicals or other materials shall not be incorporated in the concrete to prevent freezing. Calcium chloride shall not be used.

C. Hot Weather Requirements: The temperature of the concrete placed during hot weather shall not exceed 85 degrees F except where an approved retarder is used. The mixing water and/or aggregates shall be cooled, if necessary, to maintain a satisfactory placing temperature. In no case shall the placing temperature exceed 95 degrees F.

3.07 CONSTRUCTION JOINTS

A. Construction joints shall be located as indicated or approved. Where concrete work is interrupted by weather, end of work shift or other similar type of delay, location and type of construction joint shall be subject to approval of the ENGINEER. Unless otherwise indicated and except for slabs on grade, reinforcing steel shall extend through construction joints. Construction joints in slabs on grade shall be keyed or doweled as shown. Concrete columns, walls, or piers shall be in place at least 2 hours, or until the concrete is no longer plastic, before placing concrete for beams, girders, or slabs thereon. In walls having door or window openings, lifts shall terminate at the top and bottom of the opening. Other lifts shall terminate at such levels as to conform to structural requirements or architectural details. Where horizontal construction joints are required, a strip of 1-inch square-edge lumber, beveled and oiled to facilitate removal, shall be tacked to the inside of the forms at the construction joint. Concrete shall be placed to a point 1 inch above the underside of the strip. The strip shall be removed 1 hour after the concrete has been placed, and any irregularities in the joint line shall be leveled off with a wood float, and all laitance shall be removed. Prior to placing additional concrete, horizontal construction joints shall be prepared as specified in paragraph 3.01, PREPARATION OF SURFACES.

3.08 FINISHING CONCRETE

A. Formed Surfaces

1. Repair of Surface Defects: Surface defects shall be repaired within 24 hours after the removal of forms. Honeycombed and other defective areas shall be cut back to solid concrete or to a depth of not less than 1 inch, whichever is greater. Edges shall be cut perpendicular to the surface of the concrete. The prepared areas shall be dampened and brush-coated with neat cement grout. The repair shall be made using mortar consisting of not more than 1 part cement to 2-1/2 parts sand. The mixed mortar shall be allowed to stand to stiffen (approximately 45 minutes), during which time the mortar shall be intermittently remixed without the addition of water. After the mortar has attained the stiffest consistency that will permit placing, the patching mix shall be thoroughly tamped into place by means approved by the ENGINEER and finished slightly higher than the surrounding surface. For Class A and Class B finished surfaces the cement used in the patching mortar shall be a blend of job cement and white cement proportioned to produce a finished repair surface matching, after curing, the color of adjacent surfaces. Holes left after the removal of form ties shall be cleaned and filled with patching mortar. Holes left by the removal of tie rods shall be reamed and filled by dry-packing. Repaired surfaces shall be cured as required for adjacent surfaces. The temperature of concrete, mortar patching material, and ambient air shall be above 50 degrees F while making repairs and during the curing period. Concrete with defects which affect the strength of the member or with excessive honeycombs will be rejected, or the defects shall be corrected as directed.

2. Class A Finish: Where a Class A finish is indicated, fins shall be removed immediately upon removal of forms. A mortar mix consisting of one part portland cement and two parts well-graded sand passing a No. 30 sieve, with water added to give the consistency of thick paint, shall be prepared. White cement shall be used to replace part of the job cement. After the surface has been thoroughly wetted and allowed to approach surface dryness, the mortar shall be vigorously applied to the area by brick rubbing, to completely fill all surface voids. Excess grout shall be scraped off with a trowel. As soon as it can be accomplished without pulling the mortar from the voids, the area shall be rubbed with burlap pads until all visible grout film is removed. The rubbing pads shall have on their surfaces the same sand-cement mix specified above but without any mixing water. The finish of any area shall be completed in the same day, and the limits of a finished area shall be made at natural breaks in the surface. The surface shall be continuously moist cured for 48 hours. The temperature of the air adjacent to the surface shall be not less than 40 degrees F for 24 hours prior to, and 48 hours after, the

application. In hot, dry weather the smooth finish shall be applied in shaded areas.

3. Class B Finish: Where a Class B finish is indicated, fins shall be removed. Concrete surface shall be smooth with a texture at least equal to that obtained through the use of Grade B-B plywood forms.

4. Class C Finish: Where a Class C finish is indicated, fins shall be removed. Concrete surfaces shall be relatively smooth with a texture imparted by the forms used.

5. Class D Finish: Where a Class D finish is indicated, fins exceeding 1/4 inch in height shall be chipped or rubbed off. Concrete surfaces shall be left with the texture imparted by the forms used.

B. Unformed Surfaces: In cold weather, the air temperature in areas where concrete is being finished shall not be less than 40 degrees F. In hot windy weather when the rate of evaporation of surface moisture, as determined by methodology presented in ACI 305R, may reasonably be expected to exceed 0.2 pounds per square foot per hour; coverings, windbreaks, or fog sprays shall be provided as necessary to prevent premature setting and drying of the surface. The dusting of surfaces with dry materials or the addition of water during finishing will not be permitted. Finished surfaces shall be plane, with no deviation greater than 5/16-inch when tested with a 10-foot straightedge. Surfaces shall be pitched to drains.

1. Rough-Slab Finish: Slabs to receive fill or mortar setting beds shall be screened with straightedges immediately after consolidation to bring the surface to the required finish level with no coarse aggregate visible.

2. Float Finish: Slabs where indicated shall be given a float finish. Screeding shall be followed immediately by darbying or bull floating before bleeding water is present, to bring the surface to a true, even plane. Concrete that portrays stickiness shall be finished with a magnesium float in lieu of a wood float, and left free of ridges and other projections. **DO NOT USE STEEL TROWELS OR FRESNOS.**

3. Trowel Finish: Slabs where indicated, shall be given a trowel finish immediately following floating. Surfaces shall be troweled to produce smooth, dense slabs free from blemishes including trowel marks. In lieu of hand finishing, an approved power finishing machine may be used in accordance with the directions of the machine manufacturer. A final hard steel troweling shall be done by hand. Trowel finish shall be used on wearing surfaces and where a smooth finish is required.

4. Broom Finish: After floating, slabs where indicated, shall be lightly trowelled, and then broomed with a fiber-bristle brush in a direction transverse to that of the main traffic.

3.09 CURING AND PROTECTION

A. General: All concrete shall be cured by an approved method for the period of time given below:

Concrete with Type III cement	3 days
Concrete with Type II or IIA, or V, low alkali cement	7 days
Concrete with Type IP-A(MS) cement blended with pozzolan	10 days

B. Immediately after placement, concrete shall be protected from premature drying extremes in temperatures, rapid temperature change, mechanical injury and injury from rain and flowing water. Air and forms in contact with concrete shall be maintained at a temperature above 50 degrees F for the first 3 days and at a temperature above 32 degrees F for the remainder of the specified curing period. Exhaust fumes from combustion heating units shall be vented to the outside of the enclosure and heaters and ducts shall be placed and directed so as not to cause areas of overheating and drying of concrete surfaces or to create fire hazards. All materials and equipment needed for adequate curing and protection shall be available and at the site prior to placing concrete. No fire or excessive heat shall be permitted near or in direct contact with the concrete at any time. Curing shall be accomplished by any of the following methods, or combination thereof, as approved.

C. Moist Curing: Concrete to be moist-cured shall be maintained continuously wet for the entire curing period. If water or curing materials used stains or discolors concrete surfaces which are to be permanently exposed, the concrete surfaces shall be cleaned. When wooden forms are left in place during curing, they shall be kept wet at all times. If the forms are removed before the end of the curing period, curing shall be carried out as on unformed surfaces, using suitable materials. Horizontal surfaces shall be cured by ponding, by covering with a 2-inch minimum thickness of continuously saturated sand, or by covering with waterproof paper, polyethylene sheet, polyethylene-coated burlap or saturated burlap. Once the moist curing has started the concrete surface must not be allowed to become surface dry for the entire curing period.

D. Membrane Curing: Membrane curing shall not be used on surfaces that are to receive any subsequent treatment depending on adhesion or bonding to the concrete; except a styrene acrylate or chlorinated rubber compound meeting ASTM C 309, Class B requirements may be used for surfaces which are to be painted or are to receive bituminous roofing or waterproofing, or floors that are to receive adhesive applications of resilient flooring. The curing compound selected shall be compatible with any subsequent paint, roofing, waterproofing or flooring specified. Membrane curing compound shall not be used on surfaces that are maintained at curing temperatures with free steam. Curing compound shall be applied to formed surfaces immediately after the forms are removed and prior to any patching or other surface treatment except the cleaning of loose sand, mortar, and debris from the surface. Surfaces shall be thoroughly moistened with water and the curing compound shall be applied to slab surfaces as soon as the bleeding water has disappeared, with the tops of joints being temporarily sealed to prevent entry of the compound and to prevent moisture loss during the curing period. Compound shall be applied in a one-coat continuous operation by mechanical spraying equipment, at a uniform coverage in accordance with the manufacturer's printed instructions. Concrete surfaces which have been subjected to rainfall within 3 hours after curing compound has been applied shall be resprayed by the method and at the coverage specified. On surfaces permanently exposed to view, the surface shall be shaded from direct rays of the sun for the duration of the curing period. Surfaces coated with curing compound shall be kept free of foot and vehicular traffic, and from other sources of abrasion and contamination during the curing period.

- END OF SECTION -

SECTION 11223

SUBMERSIBLE PUMPS

PART 1 - GENERAL

1.01 SCOPE

The Contractor shall furnish, install and place into operation one Myers sump pumping system. Like items of equipment specified herein shall be the end products of one manufacturer to achieve standardization of appearance, maintenance, spare parts, and manufacturer's services.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

Pumps and all appurtenances shall be new products of the same manufacturer: Myers.

2.02 SERVICE CONDITIONS

At each pump station, the design conditions must be met with a single pump. The horsepower values listed shall not be exceeded at any point on the published curves.

Liquid pumped: Groundwater

2.03 PERFORMANCE CHARACTERISTICS

A. **Sump Pump** (Myers SP25A1 or V1 OAE)

Curve Data:

Head (ft)	GPM
5	27
10	21
15	15
20	6

Phase: Single
Voltage: 120V, 60HZ
Power: ¼ HP

- END OF SECTION -

SECTION 15100

MECHANICAL APPURTENANCES

PART 1 GENERAL

1.01 SUMMARY

A. The CONTRACTOR shall furnish and install all piping and equipment.

1.02 RELATED WORK

A. Related work specified in other sections:

Section 03300 – Cast-in-place Concrete
Section 11223 – Submersible Pumping Systems

1.03 MEASUREMENT AND PAYMENT

A. Measurement and payment for mechanical appurtenances shall not be paid as a unit item, but shall be included in the item of work to which it pertains.

1.04 REFERENCES

A. The latest edition of the following publications form a part of this specifications to the extent referenced. The publications are referred to in the text to by basic designation only.

B. AMERICAN WATER WORKS ASSOCIATION (AWWA)

1. C-500 Metal-Seated Gate Valves for Water Supply Services
2. C-502 Dry-Barrel Fire Hydrants
3. C-508 Swing-Check Valves for Waterworks Service, 2 In. through 24 In.
4. C-509 Resilient-Seated Gate Valves for Water Supply Service
5. C-512 Air-Release, Air/Vacuum, and Combination Air Valves for Waterworks Service
6. C-701 Turbine Meters

1.05 SUBMITTALS

A. Submit catalog cuts on all mechanical appurtenances including: fittings, valves, or other items shown on the Drawings referencing each item by mark number. Information shall indicate manufacture specification compliance and dimensional data.

PART 2 PRODUCTS

2.01 CHECK VALVE

A. Install check valve as shown on drawings.

2.02 DRAIN LINE CHECK VALVE

A. Drain line check valves shall be as manufactured by Red Valve, and shall be the Tideflex Model TH-1 (no approved equal), low-head check valve for installation at the location shown on the drawings.

PART 1 EXECUTION

3.01 INSTALLATION

A. Valves, valve-operating units, stem extensions and other accessories shall be installed by the Contractor where shown, or where required in the opinion of the Engineer, to provide for convenience in operation. Where buried valves are indicated, the Contractor shall furnish and install valve boxes to 3-inches above grade in unimproved areas, or at grade with concrete collar as shown on the Drawings in improved areas. All gate valves and boxes shall be new and recently manufactured.

Install mechanical appurtenances as indicated on the plans and in accordance with the manufacturer's written instructions.

Valve boxes shall be installed with concrete collars as noted on the drawings.

- END OF SECTION -